UNIVERSITY OF NORTH CAROLINA – CHAPEL HILL

Pedal to the Metal

Bicycle-transit integration in San Francisco: Existing conditions, needs, and recommendations for Polk Street

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A review of citywide policies, programs, and plans related to bicycling and transit provides the background for a corridor study of Polk Street. Existing conditions are reported and synthesized to identify needs. A literature review revealed four main strategies for integration; these were used to produce a set of recommendations. Two classes of recommendations were provided: "ideal" and "critical," reflecting a desire to create an exemplary bicycle-transit integrated street but also to entertain those improvements that are most feasible. The study was guided by four goals: (1) to improve bicyclist and pedestrian safety near transit, (2) to alleviate congestion on crowded transit vehicles, (3) to increase bicycle and transit mode share, and (4) to prioritize transit reliability.

Executive Summary

What is bicycle-transit integration?

"Integration" encompasses the physical as well as conceptual marriage of bicycling and transit in San Francisco. To be integrated means to have bicycling and transit networks and policies that encourage, rather than discourage, each other's use.

Purpose and Vision

This study aimed to examine bicycle-transit integration in San Francisco. It had two purposes:

1) To provide a framework and initial background information for a citywide San Francisco Municipal Transportation Agency (SFMTA) bicycle-transit integration plan;
2) To study the Polk Street corridor and recommend bicycle-transit integration strategies.

In order to guide the study of Polk Street, a draft vision statement, goals, and objectives for the SFMTA's citywide plan was established.

> ***Vision Statement:*** *A San Francisco that enables residents to access destinations by bicycle and transit comfortably, conveniently, safely, and efficiently.*

Motivations

Several factors motivated this study. First, San Francisco has adopted ambitious goals for bicycle and transit use. By 2020, the city aims to have 20 percent of trips made by bicycle. By 2035, 40 percent of trips should be made by bicycling and walking combined. On the transit side, by 2035, 30 percent of trips should be made by transit. Additionally, the city has a long-standing Transit First policy, which presents transit, bicycling, and walking as attractive alternatives to the private automobile. It encourages bicycling specifically as an access mode to transit and suggests bicycle lanes, bicycle parking, and innovative solutions to encouraging transit use in promoting overall safe and efficient movement in the city.

Second, a 2011 customer satisfaction survey revealed two top reasons why people do not ride Muni more often: the need to travel more quickly and high waiting times. Bicycle-transit integration can address these concerns directly.

Third, bicycle-transit integration is most feasible with high levels of both bicycling and transit use – conditions that exist in San Francisco. The integration of the two modes creates a greater competitor to the automobile; integration can be seen as a self-promoting strategy.

Goals and Objectives

This study was guided by four goals and their associated objectives. These goals and objectives may be refined at a later date for the citywide bicycle-transit integration plan with guidance from the Technical Advisory Committee (TAC), which was established in March 2012. These four goals are:

(1) Improve bicyclist and pedestrian safety near transit
(2) Alleviate passenger loads on crowded Muni lines by converting some transit trips to bicycle trips
(3) Increase bicycle and transit mode share
(4) Prioritize transit reliability

Each goal was tied to several objectives – more specific aims that guided this study and the resulting recommendations. These objectives can be found in the Introduction.

Process

A literature review of current practices, academic research, and design guidance from the U.S. and abroad revealed four main bicycle-transit integration strategies: bicycle parking, bicycles-on-transit, on-street enhancements, and bicycle sharing systems. With these in mind, existing citywide bicycle and transit plans, policies, and projects were documented and existing conditions on Polk Street were reviewed. A narrative of Polk Street was developed in the Existing Conditions report and Needs Assessment section, which was used to highlight the corridor-specific existing conditions that hinder the achievement of goals (1) – (4). The four strategies identified in the Literature review were applied to these needs in order to create a set of programmatic and infrastructural recommendations. Recommendations were presented in two categories: Ideal (unconstrained proposals) and Critical (must-have proposals).

Existing Conditions

Existing conditions at three geographic scopes were examined. First, maps of bicycle facilities, the transit network, and demographic variables at the citywide scale provided justification for a focus on the Polk Street corridor. Second, a review of existing bicycle and transit plans and policies established the state of the practice in San Francisco. The most detailed existing conditions report reviews several characteristics of Polk Street itself, which is divided into a northern, central, and southern segment for simplification. Data such as bicycle, transit, and vehicle volumes, land uses, collision history, and topography were gathered.

Needs Assessment

In needs assessment, the existing conditions on Polk Street were synthesized, which highlighted specific issues that threaten the realization of the four main goals of bicycle-transit integration. Similarly to existing conditions, these needs, or gaps in service, were addressed on three scales: corridor/neighborhood, point/station, and city-/system-wide.

Recommendations

As noted previously, two sets of recommendations were made. The first is visionary and based on an unconstrained view of Polk Street; the aim was to envision an exemplary bicycle-transit integrated corridor as if it were being created from scratch. These recommendations include removal of on-street parking in some sections and installation of separated cycle tracks along Polk Street. The second set, "critical" recommendations, weighted existing constraints more heavily and proposed investments that are critical to the success of the city's many bicycle and transit goals. These include demarcating bicycle space on Polk Street and maintaining on-street parking.

Recommendations focus on the specific locations identified in needs assessment as particularly troublesome or opportunistic. Some programmatic and policy recommendations were also made, and visual aids augment the textual descriptions provided.

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List of Acronyms

BART – Bay Area Rapid Transit
BRT – Bus Rapid Transit
BSP – Better Streets Plan
CAS – Climate Action Strategy
CVC – California Vehicle Code
LRV – Light rail vehicle
SFBC – San Francisco Bicycle Coalition
SFCTA – San Francisco County Transportation Authority
SFMTA – San Francisco Municipal Transportation Agency
SWITRS – Statewide Integrated Traffic Records System

1. Introduction

1.1 Background

In 2010, the San Francisco Board of Supervisors adopted a goal to reach 20 percent of all trips by bicycle by the year 2020. This aggressive target is in line with the goals of the San Francisco Municipal Transportation Agency's (SFMTA) 2009 San Francisco Bicycle Plan. The ongoing Transit Effectiveness Project (TEP) of the SFMTA seeks to improve safety, service reliability, and reduce travel time for Muni service. In order to ensure the success of these ongoing projects, San Francisco must increase and enhance its set of alternatives to private automobile use.

In the fall of 2011, the SFMTA applied for and received an $180,000 Safe Routes to Transit (SR2T) planning grant from TransForm. TransForm is administrator of the Metropolitan Transportation Commission's (MTC) Regional Measure 2 (RM2) funds, monies collected through voter-approved bridge toll increases for congestion mitigation projects (MTC, 2011).

The SR2T grant funds a bicycle-transit integration project to be performed by the SFMTA throughout 2012 and into 2013. The project is intended to identify the needs for bicycle-transit integration on several key corridors and recommend a comprehensive set of policy and capital improvements.

This master's project contributes to the SFMTA's overall effort through two main components: a citywide component and a corridor-specific component. Literature, current policy, and adopted plans are reviewed in order to make citywide recommendations where existing conditions limit the potential for San Francisco to achieve its ambitious bicycle and transit mode share goals. The corridor-specific component focuses on one San Francisco corridor to provide capital improvements recommendations that may serve as examples for the wider city effort.

The vision statement, goals, and objectives listed below are preliminary statements for the overall SFMTA project; they are the guiding principles for the recommendations made in this master's project.

1.2 Vision, Goals & Objectives

Vision Statement: *A San Francisco that enables residents to access destinations by bicycle and transit comfortably, conveniently, safely, and efficiently*

Goal 1: Improve bicyclist and pedestrian safety near transit

> *Objective 1.1:* Reduce conflicts between bicycles and transit traveling along the same routes
>
> *Objective 1.*2: Reduce conflicts between bicycles and pedestrians at transit stops

*Objective 1.*3: Increase perceived safety of bicycling along transit routes

Objective 1.4: Increase transit operator training opportunities for bus-bicycle interactions

Goal 2: Alleviate congestion on crowded Muni lines by converting some transit trips to bicycle trips

Objective 2.1: Reduce instances of crowding on transit lines within ¼ mile of the bicycle network

*Objective 2.*2: Increase the number of transit passengers who also make the same origin-destination trip using a bicycle some of the time

*Objective 2.*3: Market the bicycle sharing program to transit users

Goal 3: Increase bicycle and transit mode share

Objective 3.1: Increase combined bicycle-transit trips

Objective 3.2: Increase secure bicycle parking at major transit hubs and transfer points

Objective 3.3: Increase bicycle parking within ¼ mile of major transit corridors

Objective 3.4: Coordinate with regional transit agencies (BART, Caltrain) and the Transbay Terminal on increasing bicycle access

Goal 4: Prioritize transit reliability

Objective 4.1: Reduce dwell time for passengers with bicycles

Objective 4.2: Reduce transit delays caused by bicyclists sharing right-of-way

1.3 Motivations

The San Francisco Transit First policy (Section 8A.115 of the San Francisco Charter) creates a launching pad for bicycle-transit integration. Its main goal is to promote the use of transit, bicycling and walking as alternatives to the private automobile. Additionally, the city has goals of reaching 20 percent of trips by bicycle by 2020, 40 percent of trips by walking and bicycling combined, and maintaining 30 percent mode share by transit by 2035. Given the expected increase in overall trips, transit trips would need to double and bicycling trips increase more than fivefold in order to reach these goals (SFMTA, 2011).

Second, a 2011 SFMTA customer satisfaction survey, which sampled people who had ridden Muni at least once in the past 6 months, found that the number two reason (11.2 percent of all 556 responses) why people do not ride Muni more was that Muni takes too long and they dislike waiting (Corey, Canapary, & Galanis, 2012). Integrating bicycles with transit directly addresses this issue in two ways: first, by acting as a *complement* to transit in reducing access or egress

travel time or in reducing transfers; second, by acting as a *substitute* for transit when transit trips can safely and comfortably be made instead by bicycle.

Lastly, the 2009 American Community Survey shows the share of work trips taken by transit and bicycle in U.S. cities. San Francisco ranks among the highest in transit mode share for commutes, and experienced a 50 percent increase in bicycle commute mode share between 2000 and 2009 (Freemark, 2010). Bicycle-transit integration is most feasible with high levels of both bicycling and transit use (Pucher & Buehler, 2009 citing Hegger, 2007; Rietveld, 2000; Martens, 2004; Martens, 2007). The integration of the two modes also creates a greater competitor to the automobile; integration can be seen as self-promoting strategy (Hegger, 2007). Therefore, the San Francisco context provides ample opportunity to take advantage of the bicycle-transit synergies that already exist.

2. Existing Conditions

2.1 Citywide plans and projects

Several adopted or ongoing planning efforts in San Francisco relate to this bicycle-transit integration work. Here, a summary of those plans is presented. These documents will be referenced throughout the remainder of the document.

2.1.1 2009 San Francisco Bicycle Plan

One of eight main goals in the 2009 bicycle plan is to "expand bicycle access to transit and bridges" (SFMTA, 2009). A map overlaying the bicycle and transit networks is provided,[1] along with several objectives related to their overlap.

- "Ensure that the bicycle route network provides bicycle access to all San Francisco Municipal Transportation Agency (SFMTA) Muni Metro, Bay Area Rapid Transit (BART) and Caltrain stations, ferry terminals and other major transit hubs;"[2]
- "Provide convenient bicycle access and bicycle parking at transit stations;"[3]
- "When improvements are made to the bicycle route network, the impacts to other modes, including pedestrians, transit and motor vehicles, must be taken into consideration and balanced with the overall vision of transportation in the City;"[4]
- "Bicycle improvements should not create negative impacts to transit operations."[5]

In addition to these broad objectives, several specific actions are called for. Many of these relate to the goals and objectives of this study. While the implementation status of the bicycle plan's infrastructure projects is closely tracked by SFMTA staff, this is not so for the non-infrastructure action items.

- Conduct a before and after study on the impacts of allowing bicycles in exclusive bus/taxi lanes (Action 1.5)
- Create an inventory of locations along the bicycle route network that intersect or run parallel to railroad tracks, and identify appropriate measures to mitigate the impacts of the track crossings to bicyclists (Action 1.17)
- Work with the Planning Department to consolidate Sections 155.1-155.5 of the Planning Code to provide clearer regulation, guidance and exemptions related to bicycle parking (Action 2.1)
- Ensure that all City leases are negotiated to include the required level of bicycle parking by cooperative efforts of the City Real Estate Department of the SFMTA (Action 2.8)

[1] See p. 1-21.
[2] See p. iv.
[3] See p. ix.
[4] See p. Intro-2.
[5] See p. 1-20.

- Work with Planning Department to amend the Planning Code to require building owners to allow tenants to bring their bicycles into buildings unless Class I bicycle parking is provided (Action 2.12)
- Create an SFMTA policy that explicitly permits folded bicycles on all SFMTA transit vehicles (Action 3.1) – implemented 5/26/2011 (SFMTA staff, personal communication, June 20, 2011)
- Develop a pilot program to provide bicycle access on SFMTA light rail for a trial period that would be monitored for potential future implementation (Action 3.2)
- Update the SFMTA's bicycle accessibility [to transit] guidelines and widely distribute and publicize these guidelines (Action 3.3)
- Create an SFMTA policy that allows bicyclists with disabled bicycles to bring them aboard SFMTA transit vehicles, interior space permitting and at the vehicle operator's discretion, when the SFMTA transit vehicle either does not have bicycle racks or when the racks are full (Action 3.4)
- Install bicycle racks on all SFMTA-operated buses, and work with other transit operators with buses operating in San Francisco to install bicycle racks on their bus fleets (Action 3.5)
- Work with BART to analyze existing bicycle policies, identify expanded bicycle access times and create a trial program for non-folding bicycle access in both directions on Transbay peak period trains (Action 3.6)
- Work with Caltrain to expand bicycle access on its trains and to its San Francisco stations by promoting bicycling to stations and by providing secure bicycle parking at station areas (Action 3.7)
- Ensure that all San Francisco transit stations, including the new Transbay Terminal, provide barrier-free bicycle access and state-of-the-art bicycle parking facilities, and work with the California High-Speed Rail Authority to ensure bicycles are accommodated on its long distance trains (Action 3.8)
- Work with San Francisco Bay Area transit operators and the Metropolitan Transportation Commission (MTC) to develop, implement, maintain, expand and enforce improved intermodal bicycle access (Action 3.9)
- Promote bicycle parking stations at major transit hubs that provide secure, monitored bicycle parking, bicycle commuter information and bicycle maintenance services (Action 3.10)
- Develop an SFMTA bicycle safety workshop for transit vehicle operators and other large fleet-vehicle operators (Action 4.8)
- Develop a standardized procedure for reporting bicycle-related incidents with transit vehicles and ensure that this information is readily available to appropriate City staff (Action 5.13)
- Conduct a feasibility study for a public bicycle sharing program and if feasible, develop a plan for potential future implementation including any required environmental review (Action 6.6) – RFP issued February 2012; in implementation spring/summer 2012 (SFMTA staff, personal communication, February 16, 2012)

Since the adoption and partial implementation of the Bicycle Plan, several additional spot, low cost projects have been recommended by the SFMTA to improve upon those initially recommended. Among these is a proposed contra-flow bicycle lane between Grove and Market Streets where traffic currently runs one-way southbound. This project is included in the SFMTA's draft Capital Improvement Plan for 2013/2014.

2.1.2 SFMTA's Transit Effectiveness Project (TEP)

The TEP is an on-going project of the SFMTA. It is the Agency's first comprehensive review of Muni in a generation, and is informed by public input, technical analysis, and best practices. The project has four main objectives: to improve Muni service reliability; to reduce transit travel time; to improve customer experience; and to improve service effectiveness and efficiency (SFMTA, 2011c).

From these inputs, the TEP developed a list of projects to be implemented by 2017. While on-street bicycle-transit interactions are not explicitly noted in the project's objectives, some of the pre-2017 TEP projects include changes to the bicycle network. These include projects along 16th Street and Geneva Avenue, with implementation anticipated to begin in late 2013-2014. Some of the projects involve removal of bicycle lanes, particularly along 16th Street, while others involve moving bicycle lanes behind transit stops (e.g. Geneva Avenue).

On 16th Street, the decision to remove the bicycle lane was made due to the fact that not enough room exists for both the planned transit-only lane and a bicycle lane. The 16th Street bicycle lane will be moved to 17th Street. On Geneva Avenue, the decision was made to have a bicycle lane/cycle track run behind the bus boarding islands (creating a "bus bulb plaza") in order to avoid bus-bicycle conflicts at bus stops. This design has also been proposed for Masonic Avenue (SFMTA, 2011a). See Table 22 in Appendix D for a full list of TEP bicycle-related projects.

2.1.3 BART Bicycle Parking and Access Plan

Bay Area Rapid Transit (BART) is currently undergoing an update to its 2002 Bicycle Parking and Access Plan. This work overlaps with SFMTA's bicycle-transit integration efforts particularly where BART and the SFMTA share stations. Through several qualitative and quantitative research efforts, BART has identified the following existing conditions:

- There is a high correlation between investment in secure bicycle parking and the share of access trips that are made by bicycle.
- Among bicycle racks located outside of station fare gates, those that are closer to the fare gates are utilized far more than those that are farther away.
- Over 20 percent of surveyed attended-bicycle-station users said they would bring their bicycle on board the train if they did not have access to the safe and secure bicycle parking that bicycle stations provide.
- The forthcoming bicycle sharing program will have kiosks at all downtown BART stations, with potential for expansion in the future.

In sum, BART identified the following factors that influence bicycle access to BART stations:

- Bicycle parking
- On-board bicycle access
- Ease of transporting bicycles through stations
- Communication
- Auto parking charges
- First/last mile route characteristics

These factors were used in the development of a Direct Ridership Model, which is a tool to predict transit ridership based on station characteristics (specifically related to bicycles).[6]

Lastly, in a gap analysis of bicycle access to BART stations, two San Francisco stations were identified as needing on-street improvements: Civic Center and Glen Park.

- There is a need to improve bicycle routes on 7th, 8th, Market, and Grove Streets in order to access Civic Center (partially covered in several 2009 Bicycle Plan projects; 7th, 8th, and Grove Streets are not).
- There are needs to construct Class II bicycle lanes on Lyell Street, Bosworth Street between Diamond and Rotteck Streets, and Monterey Boulevard on- and off-ramps from San Jose Avenue in order to access the Glen Park station (Project 5-7 in the 2009 Bicycle Plan).

2.1.4 Climate Action Strategy

SFMTA's Climate Action Strategy (CAS) was developed collaboratively between several city departments in 2011. It offers strategies to guide programs and policies to reduce greenhouse gas emissions from the transportation sector. Among other things, the extensive research effort provides facts about and recommendations related to bicycle-transit integration.

Data from the San Francisco County Transportation Authority (SFCTA) demonstrate that the highest origin-destination pairs of auto travel are along some of the SFMTA's main transit lines. This pattern presents an opportunity to shift some auto trips to transit trips, but only if transit has ample capacity.[7]

Unfortunately, the transit system has limited available capacity during peak hours. In San Francisco, the average automobile trip is less than 3 miles in length and the average transit trip is only 3.4 miles; these trips are only slightly longer than the average 2.3 mile bicycle trip. Therefore, a suggestion is made in the CAS to supplement existing transit capacity by shifting some transit trips to bicycle trips in the peak period. This would make transit and bicycles a new option for some who currently drive, increasing each of their mode shares.

[6] Note: This study does not rely on the Direct Ridership Model because the focus is not on Market Street (the corridor shared by BART and SFMTA transit) and other SFMTA transit stations are much smaller in scale and different in character.

[7] See Figure 1, p. 6 of Climate Action Strategy

The SFMTA's mode share goals are also noted in the CAS and are consistent with the goals of bicycle-transit integration: by 2020, 20 percent of trips should be made by bicycle and by 2030, 40 percent of trips should be made by bicycling and walking combined.

Related CAS recommendations include:

- Complete the implementation of the SFMTA Bicycle Plan (p. 20)
- Increase bicycle parking capacity citywide (p. 20)
- Enhance modal integration (for example, with a smartphone application that delivers travel information on all available nearby modes including travel time, price, GHGs and emissions) (p. 22)
- Implement bicycle sharing (p. 20)
- Create student IDs with integrated transit passes (p. 39)
- Require higher ratios of bicycle parking in new developments (p. 40)

2.1.5 Van Ness Bus Rapid Transit

Van Ness Avenue runs parallel to Polk Street in San Francisco. Since 2008, the SFCTA has been planning and designing a 2-mile bus rapid transit (BRT) route along Van Ness between Lombard and Mission Streets. The 2004 Countywide Transportation Plan called for a BRT feasibility study, which demonstrated the potential for significant transit benefits; this commenced the 2008 planning process (SFCTA, 2011).

Several goals and expected benefits of the project are consistent with the goals of bicycle-transit integration.

Table 1 – Van Ness BRT goals' alignment with bicycle-transit integration

Van Ness BRT Goals	Bicycle-Transit Integration Goal
Boost transit ridership (increased transit ridership on Van Ness corridor expected)	Goal 3
Improve pedestrian amenities and safety (shorter and safer pedestrian crossings, Audible Pedestrian Countdown signals)	Goal 1
Provide safe circulation for all travelers (reduced collisions expected)	Goal 1
Improve transit operational efficiency (reduced Muni operating costs expected)	Goal 4

Currently, the project is under environmental review. Therefore, three potential designs, as well as a no-build scenario, still exist as possibilities. In each case, 9 stations are planned: Van Ness at Mission, Market, McAllister, Eddy, Myrtle/Alice B. Toklas, Sutter, Sacramento, Jackson, and Union Streets.

Alternative 1: No build

- SFMTA Transit routes 47 and 49 and Golden Gate Transit routes 10, 70, 80, 93, and 101 would remain on the corridor
- Modest improvements to Van Ness Avenue signals, bus stops, and pavement

Alternative 2: Side-lane BRT with parking

- Right-most traffic lane converted to bus-only lane
- Private automobiles allowed to cross bus-only lane to reach parking or make right turns
- Bus bulbs (providing pedestrian access) provided at all station locations

Alternative 3: Center-lane BRT with right-side boarding and dual medians

- Physically-separated bus-only lanes in center of roadway
- Stations along right side of vehicles

Alternative 4: Center-lane BRT with left-side boarding and single median

- Left-most lanes in both directions converted to bus-only (not physically separated)
- Stations located in a center median, boarding on left side of vehicles

2.1.6 Geary BRT

In addition to the Van Ness BRT project, San Francisco is also planning a BRT line along Geary Avenue. A feasibility study has been conducted and approved and currently the SFCTA and the SFMTA are carrying out environmental review. The goal is to have service running by 2015. Station locations have not yet been determined; however, the Geary BRT line would intersect with the future Van Ness BRT line.

2.1.7 Mobility, Access, and Pricing Study

The SFCTA has led a feasibility study of several congestion pricing schemes in San Francisco. While there are no plans in place to implement such a scheme, the Transportation Authority Board approved the study in December 2010. Therefore, additional study of the concept is being pursued, with a decision on implementation to be made in 2013-2014. The potential pricing scheme could produce an additional funding source for public transit investments and promote both transit and bicycle use by pricing private automobile use.

2.1.8 ThinkBike 2011

In September of 2011, the Consulate General of The Netherlands hosted a "ThinkBike" event in San Francisco in partnership with the SFMTA and the San Francisco Bicycle Coalition (SFBC). The event brought Dutch bicycle transportation experts to San Francisco where they met with local planners, engineers, and bicyclists to discuss bicycling infrastructure along three major bicycle routes: Market Street, the Wiggle, and Polk Street.

Prior to the event, SFMTA staff prepared a report of existing conditions. One section of the report focuses on Polk Street between Union Street and Broadway. The Polk Street detailed information is provided in the Existing Conditions section of this report.

The recommendations from the group included a vision for Polk Street as a "People Street." They stressed solutions that would accommodate existing traffic volumes, reduce bicycle-transit and bicycle-auto conflicts, improve pedestrian experience, and enhance transit access. They also noted that Polk Street is scheduled to be repaved in 2013 – an opportunity to implement recommended improvements.

A few example improvements include a curbside bikeway with separation, intersection treatments such as bicycle signal heads and tactile warnings for pedestrians crossing bikeways, parklets and public spaces, and bikeways running behind transit stops to reduce bus-bicycle conflicts. Because these would be new facility types in San Francisco, a public outreach campaign was also suggested.

Figure 1 - ThinkBike concepts for Polk Street (SFMTA, personal communication)

2.1.9 Better Streets Plan

This conceptual plan, adopted in early 2011, provides a blueprint for the pedestrian environment in San Francisco. Any recommendations made within this bicycle-transit integration study should take the Better Streets Plan's (BSP) guidelines into account, especially as they relate to the pedestrian and transit environment. Chapters 4.1 (Street Types), 4.2 (Overall Streetscape Guidelines), 5.5 (Transit-Supportive Streetscape Design), and 5.6 (Parking Lane Treatments) will be particularly important for bicycle-transit integration recommendations. BSP street classifications are listed in the Polk Street section of this report, below.

2.1.10 San Francisco Bicycle Strategy

The Bicycle Strategy is a vision document currently under development by the SFMTA. It presents a vision of 20 percent of bicycle trips by 2020 and develops several strategies for

achieving that goal. The document is currently in draft form; when adopted by the SFMTA Board of Directors, it will guide future bicycle investments in San Francisco. Preliminary findings suggest that on-street infrastructure should receive the majority of funding for bicycle investments with supportive funding for programs, policies, and marketing campaigns.

2.1.11 Connecting the City

Figure 2 - Connecting the City vision for Polk Street; created by Woods-Bagot (SFBC, 2012)

Connecting the City is a conceptual plan developed by the SFBC (a 12,000+ member non-profit organization) that calls for the development of 100 miles of separated bikeways in the city. They have proposed three main initial routes: a north-south connector along Polk and Valencia Streets, a bay-to-beach route running east-west along Market Street and through Golden Gate Park, and a Bay Trail bikeway running along the northeastern perimeter of the city. While this document remains a community plan (not an official document of the SFMTA), some of its proposals are being implemented: in spring of 2012, San Francisco's first parking-protected bikeway will be constructed in Golden Gate Park along John F. Kennedy Drive. In February 2012, the SFBC began a public outreach campaign for separated bikeways along Polk Street. Their online survey can be found here: http://www.zoomerang.com/Survey/WEB22E7K3JKKVQ (accessed February 22, 2012).

2.1.12 Summary of Citywide plans and projects' implications for Polk Street

Table 2 below provides the key points from the plans and projects described above at the citywide scale. For Polk Street specifically, there are several things to keep in mind. First, the TEP favors separated bicycle and transit networks; the 19-Polk currently shares right-of-way with the only north-south bicycle route in this neighborhood. Second, the city is considering utilizing smartphone applications to improve the usability of the Van Ness BRT and its connectivity to future bicycle sharing stations, the 19-Polk, and other nearby transit. Integration could be further enhanced through a provision of secure bicycle parking and other amenities close to the BRT line. Third, the repaving schedule for Polk Street provides an opportunity for improvement. Fourth, bicycle accessibility to Civic Center needs to be improved. Lastly, a bicycle safety workshop for transit operators could improve interactions within the Polk Street right-of-way, and a formalized reporting procedure would reduce the burden when incidents do occur.

Table 2 – Summary of recommendations and needs from Citywide plans and projects

Mode	Category	Recommendation or Need
Transit	Operations	· Improved transit reliability · Improved service efficiency · Separated bicycle and transit networks
	Customer Experience	· Improved customer experience · Provide real-time information to customers through smartphones and other technologies to link transit, bicycle, and other modes
	Other	· Alleviate crowding on transit by shifting some peak hour transit trips to bicycle trips
Bicycle	Facilities	· Ensure bicycle network provides "convenient" access to all "major transit hubs" · Secure bicycle parking, commuter information, and maintenance services needed at all transit stations · Grove Street bicycle network upgrades to enhance access to Civic Center transit services · Upgrades to existing network and expansion to include premium facilities such as cycle tracks and bicycle boulevards
	Policies	· Provide clearer guidance on bicycle parking regulations · Increase bicycle access to buildings including requirements for new development · Clarification of operator policy when bicycle racks on buses are at capacity · Coordination with private transit operators to require bicycle racks · Bicycle safety workshop for SFMTA transit and other large vehicle operators
	Studies & Pilots	· Pilot and study allowing bicycles in bus/taxi-only lanes · Pilot and study bicycle access to LRVs, BART during peak hours · Inventory the bicycle and on-street rail network overlap and develop mitigations for bicyclist safety
	Communication	· Improved internal and external communication of bicycle access on transit and in buildings policies · Develop a reporting procedure for incidents involving SFMTA transit vehicles and bicycles
General	Public realm	Create "people streets" – inviting outdoor spaces that encourage bicycling, walking, and transit use
	Strategic investment	Coordinate corridor restructuring with repaving schedule (e.g. Polk Street in 2013)

2.2 Citywide policies and regulations

Several local and California policies affect the current state of bicycle-transit integration and the feasibility of future recommendations in San Francisco. The policies discussed below are organized into four main bicycle-transit integration strategies (see Literature and current practice review for background on these strategies).

Additionally, the city has adopted a Transit First policy as part of the San Francisco Charter. Three key pieces of guidance for bicycle-transit integration are contained in this policy. They demonstrate the common interests of this study with the long-standing policy:

- Bicycling shall be promoted by encouraging safe streets for riding, convenient access to transit, bicycle lanes, and secure bicycle parking.
- Parking policies for areas well served by public transit shall be designed to encourage travel by public transit and alternative transportation.
- The City and County shall encourage innovative solutions to meet public transportation needs wherever possible and where the provision of such service will not adversely affect the service provided by the Municipal Railway.

The full text of the policy is available as Appendix F.

2.2.1 Bicycles on transit

Currently, San Francisco does not allow full-sized (non-folding) bicycles inside its light rail vehicles (LRVs), buses, or other transit vehicles. Non-folding bicycles may be carried in racks on the front of Muni buses, which hold a maximum of two bicycles. Folding bicycles are allowed on all SFMTA public transit ("Muni") vehicles except cable cars, however seats designated for seniors or persons with disabilities must be surrendered when needed (SFMTA, 2011b).

2.2.2 Bicycle parking

San Francisco already provides several bicycle parking options. As of 2011, the city had installed 2,444 bicycle racks, 52 bicycle lockers, and 14 bicycle corrals (SFMTA, 2011c). The SFMTA's goal is to install 600 new racks each year (H. Maddox, personal communication, October 25, 2011). In addition to outdoor bicycle parking, Supervisor John Avalos has proposed legislation that would require the owners of commercial buildings to either provide secure bicycle parking indoors or allow tenants to bring bicycles into commercial buildings (G. Johnson, City Operations & Neighborhood Services Committee Clerk, personal communication, January 4, 2012). On February 16, 2012, the San Francisco Board of Supervisors (BOS) Public Safety Committee approved the legislation (San Francisco Bicycle Coalition, personal communication, February 16, 2012). On March 13, 2012, the BOS approved the legislation and as of mid-March the Bill had moved on to Mayor Ed Lee for final approval. It is expected to be signed into law (SFBC, 2012, March 13).

New York City passed a similar ordinance that went into effect in December 2009. Their law applies to commercial office buildings with at least one freight elevator. Upon the request of a tenant, a building owner or manager must either implement and post a Bicycle Access Plan within 30 days or submit an exception request within 15 days (NYCDOT, 2012). This legislation was spearheaded by the New York City advocacy group Transportation Alternatives (Sladek, 2009).

In San Francisco, currently both city- and privately-owned parking garages are required to provide bicycle parking space. City code also requires the provision of bicycle parking, lockers and showers for employees in *new* commercial and industrial buildings as well as buildings undergoing major renovations. Residential buildings with four or more units are also required to provide bicycle parking at no cost to residents (City of San Francisco, 2012).

Still, bicycle parking appears to be undersupplied in San Francisco – the SFMTA currently has approximately 300 outstanding requests for bicycle racks. Some of the examples highlighted in section 5 of this report provide suggestions for using bicycle parking as a strategy to increase the number of intermodal (bicycle and bus) trips in San Francisco.

2.2.3 On-street bicycle network

Bicycle network decisions have been influenced by many factors. As noted in the TEP, several projects relating to travel time reduction have influenced the bicycle network. The 2009 Bicycle Plan also includes a description of earlier bicycle network decisions.

There are also local and state-level policies that affect how bicycles and transit share road space. The California Vehicle Code (CVC) defines a vehicle as "a device by which any person or property may be propelled, moved, or drawn upon a highway, *excepting a device moved exclusively by human power* or used exclusively upon stationary rails or tracks" (California Department of Motor Vehicles, 2011). So, bicycles are not considered vehicles under California state law. Further, the CVC authorizes any local authority to designate a portion of any highway within its jurisdiction as exclusively for "a public mass transit guideway" (CVC Section 21655.7), which San Francisco has done in many places.

Local code specifies that the operation of a vehicle within these transit-only areas is prohibited (San Francisco Transportation Code, Section 7.2.72), and adopts the CVC definition of a vehicle. Therefore, bicycles *are* permitted to ride in transit-only lanes, as they are not considered vehicles. However, "San Francisco can only exercise the powers in this area that are delegated to it by the state," therefore, "a change in state law would be required to allow bicycles to operate in transit-only lanes" (SFMTA, 2009).

2.2.4 Bicycle sharing station location

San Francisco will launch a pilot bicycle sharing system of 500 bikes and 50 stations in the summer of 2012. Planning for station location is underway, and relies heavily on the location of

transit, jobs, retail, and public properties. Public input and additional field work helped to finalize the system's anchor nodes (SFMTA staff, personal communication, January 18, 2012).

As of March 2012, two stations near Polk Street and Van Ness had been proposed for the initial pilot phase: Polk Street at Golden Gate (near the Federal Building) and Market at Van Ness (adjacent to the SFMTA headquarters). The pilot service area extends throughout downtown San Francisco, along the Embarcadero, south to the 4th and King Caltrain station, and covers Civic Center bordered by Polk Street to the west and Turk Street to the north (SFMTA staff, personal communication, March 28, 2012).

2.3 Citywide network and population characteristics

The following section catalogs existing citywide conditions that relate to the bicycle and transit networks, their usage, and the population surrounding them. Statistics (see 2.3.1) and maps (see 2.3.2) were used to identify those areas of the city that offer the greatest potential for bicycle-transit integration.

2.3.1 Statistics

Table 3 – Citywide statistics related to bicycle-transit integration goals

Goal	Current Statistic	Source
Goal 1 Improve bicycle and pedestrian safety near transit	Non-fatal pedestrian injury collisions (2009): **695** Fatal pedestrian collisions (2009): **17** Non-fatal bicycle injury collisions (2009): **531** Fatal bicycle injury collisions (2009): **1** National bicycle safety ranking: **6th** among U.S. cities National walking safety ranking: **10th** among U.S. cities (% of all traffic fatalities that are pedestrians: **48.8%**)	(SFMTA, 2011c) (Alliance for Bicycling and Walking, 2012)
Goal 2 Alleviate crowding on transit vehicles	See Figure 6 - Transit crowding as of October 2011 and bicycle count locations	(Elizabeth Sall, SFCTA staff, personal communication, January 26, 2012)
Goal 3 Increase the bicycle and transit mode shares	Current bicycle mode share (2010): **3.5%** Current transit mode share (2010): **34.1%**	(SFMTA, 2011c)
Goal 4 Prioritize transit reliability	> 80% of TEP survey respondents reported transit	(SFMTA, 2011d)

	reliability as important for SFMTA to improve (greater than any other area such as peak service or travel time)	

Table 4 shows data from the SFMTA's Climate Action Strategy and the SFCTA travel demand modeling team that provides insight into the future of San Francisco's transportation system and the need for bicycle-transit considerations now. These data suggest first that average trip lengths in San Francisco are similar across modes, highlighting the potential for mode substitution for many trips. The data also demonstrate that a status-quo policy will leave the city far short of its 2035 mode share goals – actions must be taken now to encourage more bicycling and transit use in the future.

Table 4 - Trips by mode, 2011 and 2035

	Where we are today		**Where we are headed**	**Where we need to go**	
Mode	Average trip length in San Francisco (mi) (2010)*	Daily trips in Fall 2011**	Daily trips in 2035*	Mode split goal by 2035*	Daily trips if mode share goal is met*
Auto	2.8	1,301,692	2,808,000	30%	1,425,000
Bicycle	2.3	64,222	134,000	40%	716,000
Walking	0.9	907,558	928,000		1,190,000
Transit	3.4	593,485	886,000	30%	1,425,000
Total		1,565,266	4,756,000	100%	1,948,000

* (SFMTA, 2011)

** (Elizabeth Sall, SFCTA, personal communication, January 19, 2012)

2.3.2 Maps

Maps are used to describe the bicycle and transit context in San Francisco. These maps specify factors that are relevant for bicycle-transit integration. Each of the factors is tied with one or more of the project goals (see Vision, Goals & Objectives). This linking of current conditions with desired futures (goals) facilitates the choice of focus corridors that offer the greatest potential for project success.

The table below lists the nine maps included in the next few pages. This linkage between the mapped factors and study goals is displayed in Table 5. The third column is simply a reference for the reader. The maps were created using data from the SFMTA, SFCTA and the American Community Survey 2006-2010 five-year estimates.

Table 5 – Map catalog

Map	Goal	Goal descriptions
Figure 3: Transit and bicycle context (demonstrates overlap)	1, 3, 4	1: Bicycle and pedestrian safety 2: Alleviating crowding on transit 3: Increasing bicycle and transit mode share 4: Prioritize transit reliability
Figure 4: SFMTA bicycle parking in garages map	2, 3	
Figure 5: SF Planning Department Transit Corridor Map	Descriptive, showing transit-priority corridors	
Figure 6: Transit load (from SFCTA) with bike network, bike counts (PM)	2, 4	
Figure 7: Age	3	
Figure 8: Income	3	
Figure 9: Bike commuters	3	
Figure 10: Transit commuters	3	
Figure 11: Dwelling units/acre	3	

2.3.3 Map summary

This catalog of maps offers a broad description of the San Francisco population and the bicycling and transit conditions citywide. Several points are highlighted in the mapping exercise that lead to the designation of three corridors for special bicycle-transit integration consideration: Polk/Van Ness; Mission/Market and Mission/Valencia; and along the N-Judah light rail line.

There is a high density of transit and bicycling commuters along the Mission Street corridor, the Panhandle and Golden Gate Park areas, and in Hayes Valley as demonstrated in Figure 9 and Figure 10.

While not shown explicitly in these maps, the bicycle and transit systems overlap often; major corridors where this occurs include Market Street, Arguello Street, Polk Street, Columbus Avenue, and outer areas such as Sloat Boulevard, Portola Drive, and Ocean Avenue. Figure 3 demonstrates this to a certain extent.

Neighborhoods with the densest concentration of people aged 24-44 and households earning at least $75,000 annually include the Mission/Castro area, the Panhandle, SOMA, and along the Van Ness corridor (Figure 7 and Figure 8). These are areas with a population likely to ride a bicycle, based on results from a 2011 SFMTA bicycle survey.

The densest areas of the city, also a factor in bicycle and transit use, are north of Market Street and east of Van Ness Avenue (Figure 11).

Lastly, some of the highest bicycle count locations are in close proximity to the most crowded Muni lines (Figure 6).

This information, taken in conjunction with the San Francisco Planning Department's 2009 map of transit corridors (Figure 5), demonstrates the potential benefits from planning for bicycle-transit integration along these three corridors: Van Ness/Polk Street, Mission/Valencia and Mission/Market Streets, and along the N-Judah light rail line. These corridors were identified qualitatively in conversations with SFMTA staff using the information from these maps and professional judgment.

Transit and bicycle context

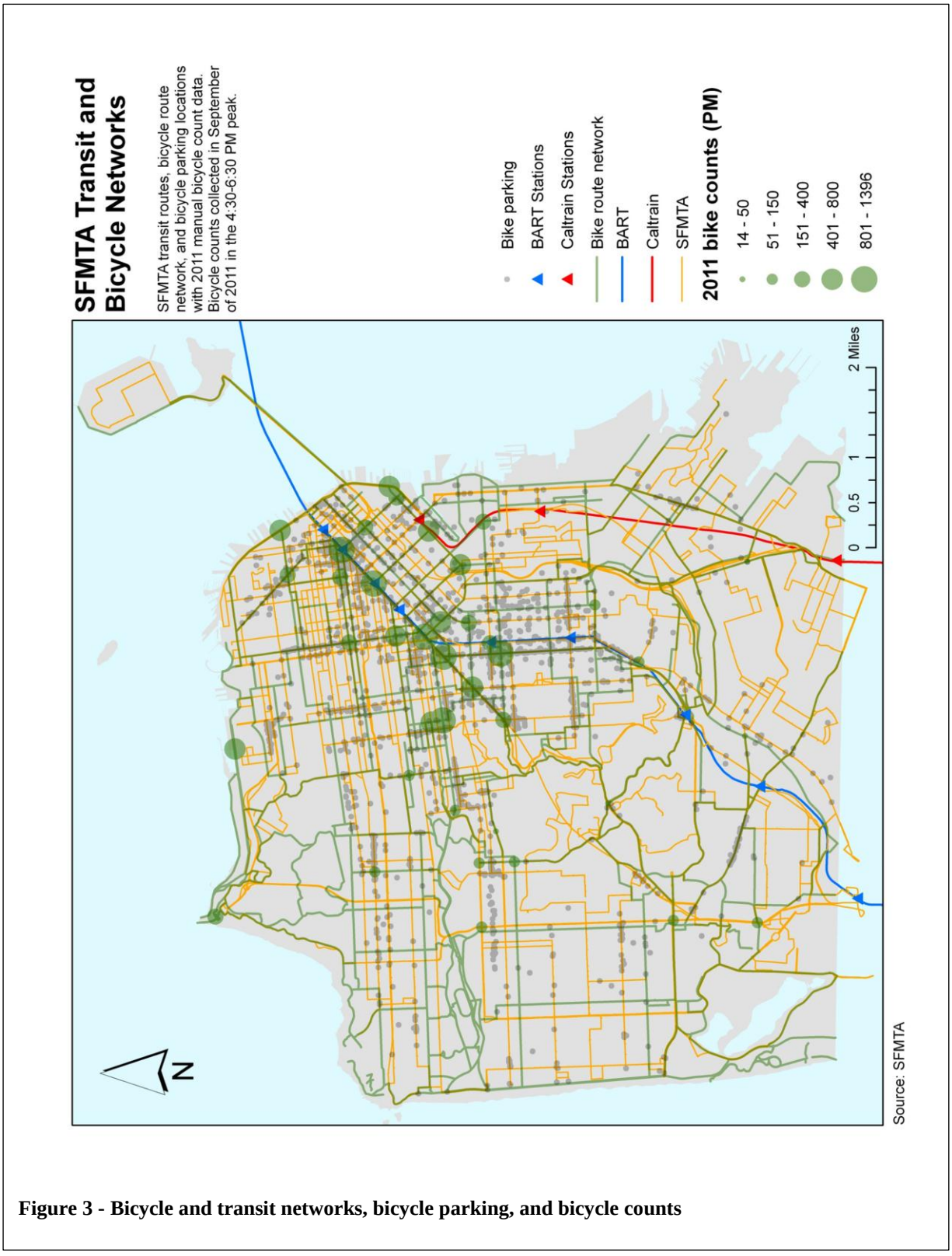


Figure 3 - Bicycle and transit networks, bicycle parking, and bicycle counts

SFMTA bicycle parking in garages map (SFMTA, 2012)

Polk Street is indicated by the arrow in below.

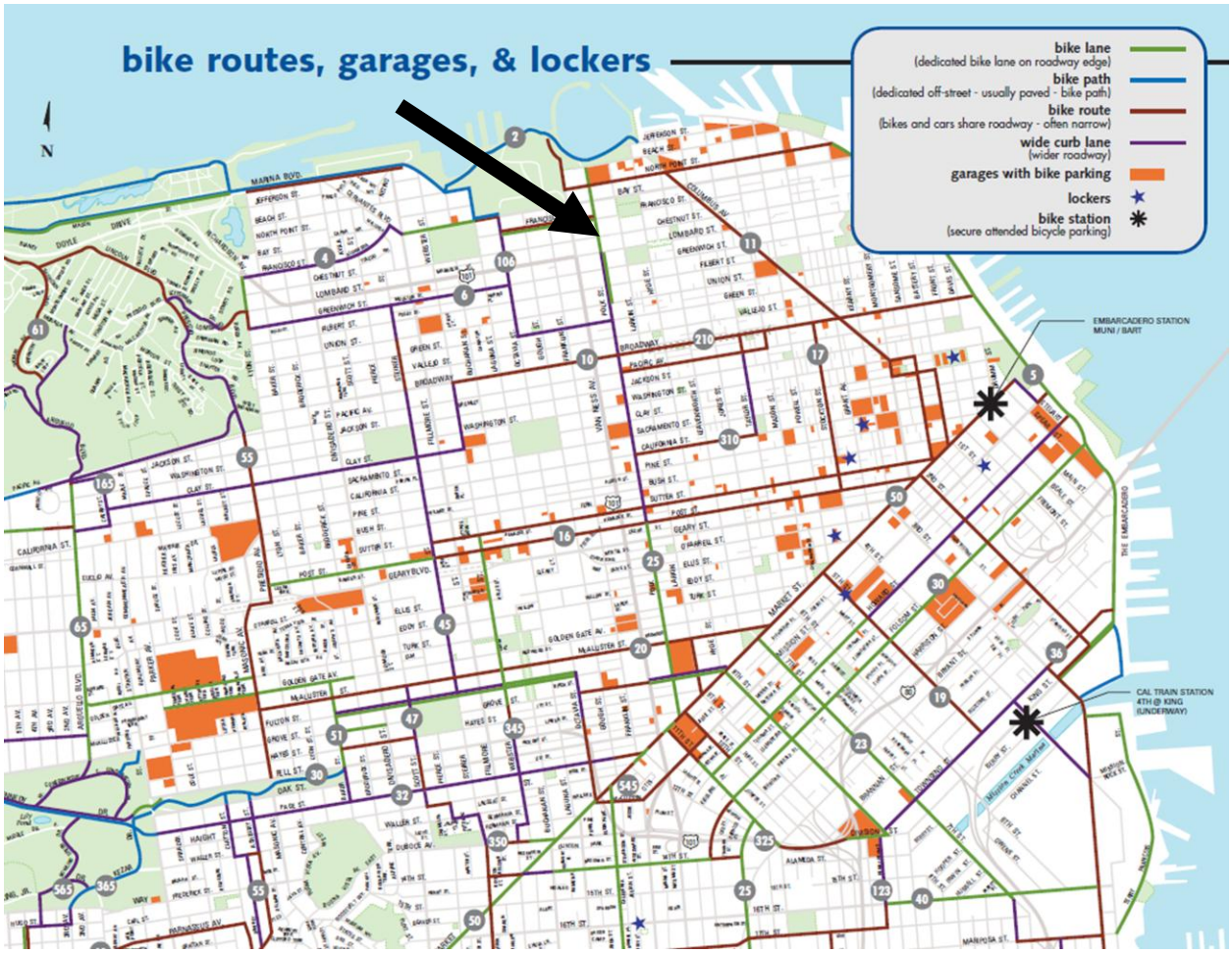


Figure 4 - SFMTA Bicycle parking and network map

SF Planning Department Transit Corridor Map (SF Planning, 2009)

Figure 5 - SF Planning Transit Corridors map

Transit load vs. bicycle network and counts

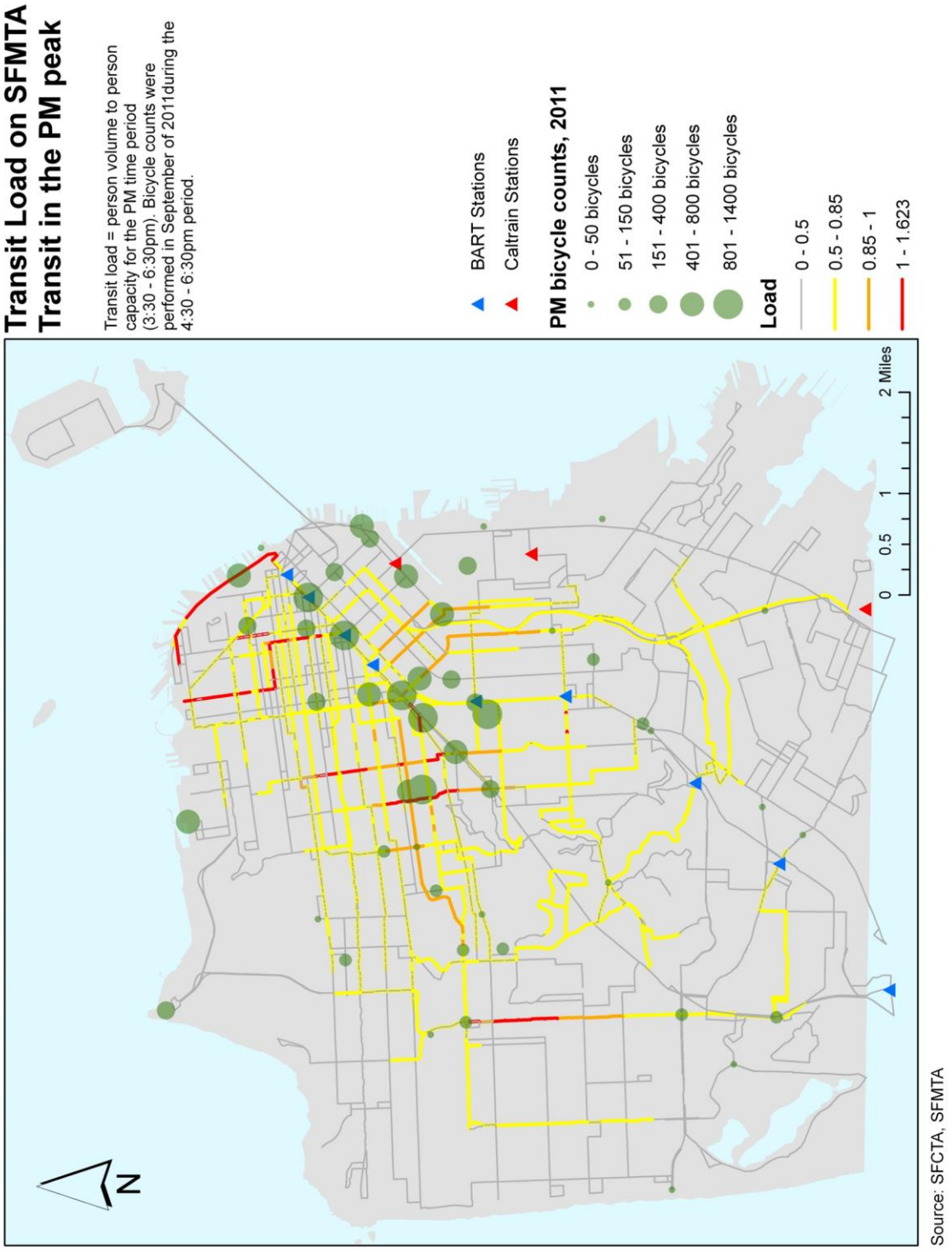


Figure 6 - Transit crowding as of October 2011 and bicycle count locations

Age distribution

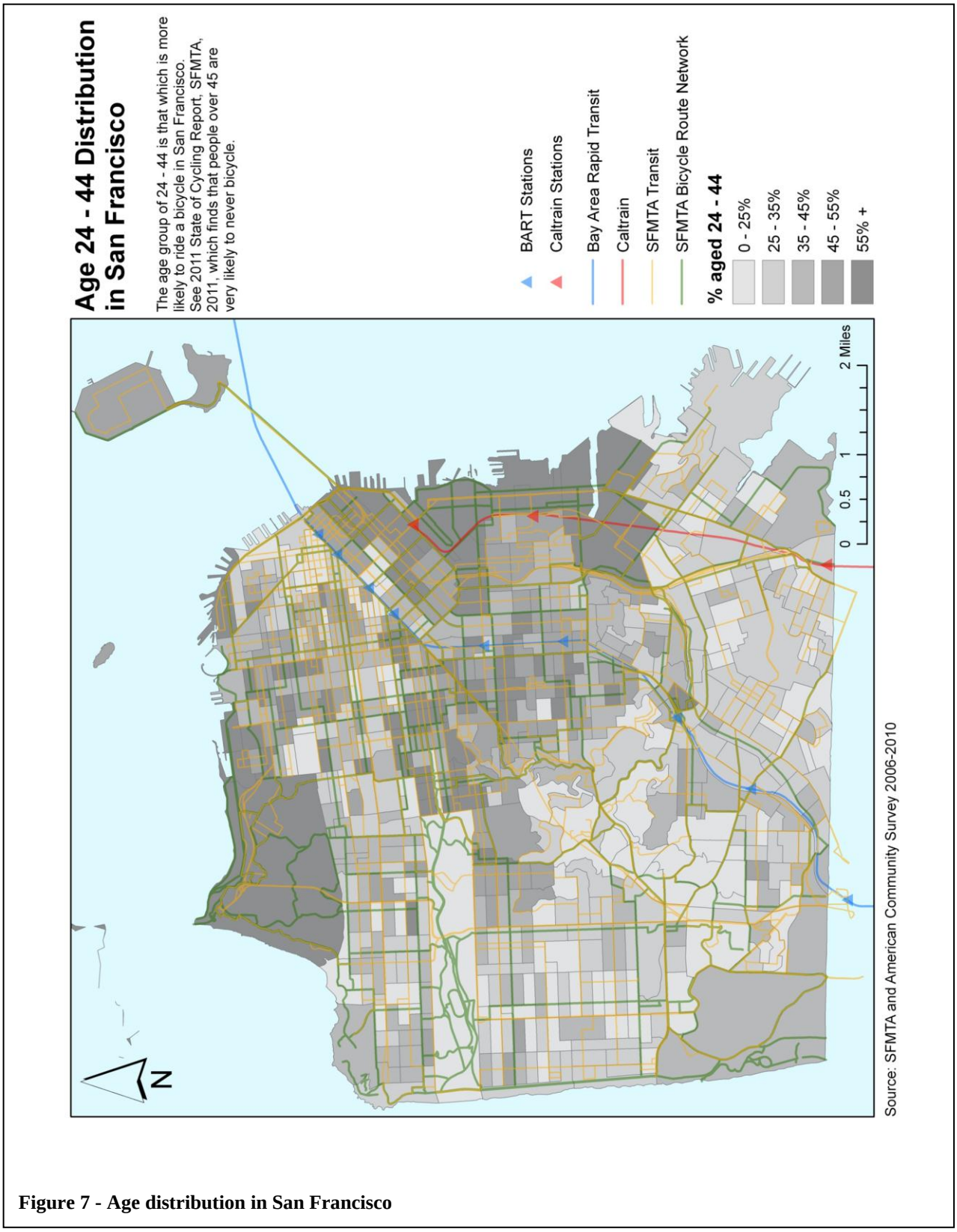


Figure 7 - Age distribution in San Francisco

Income distribution

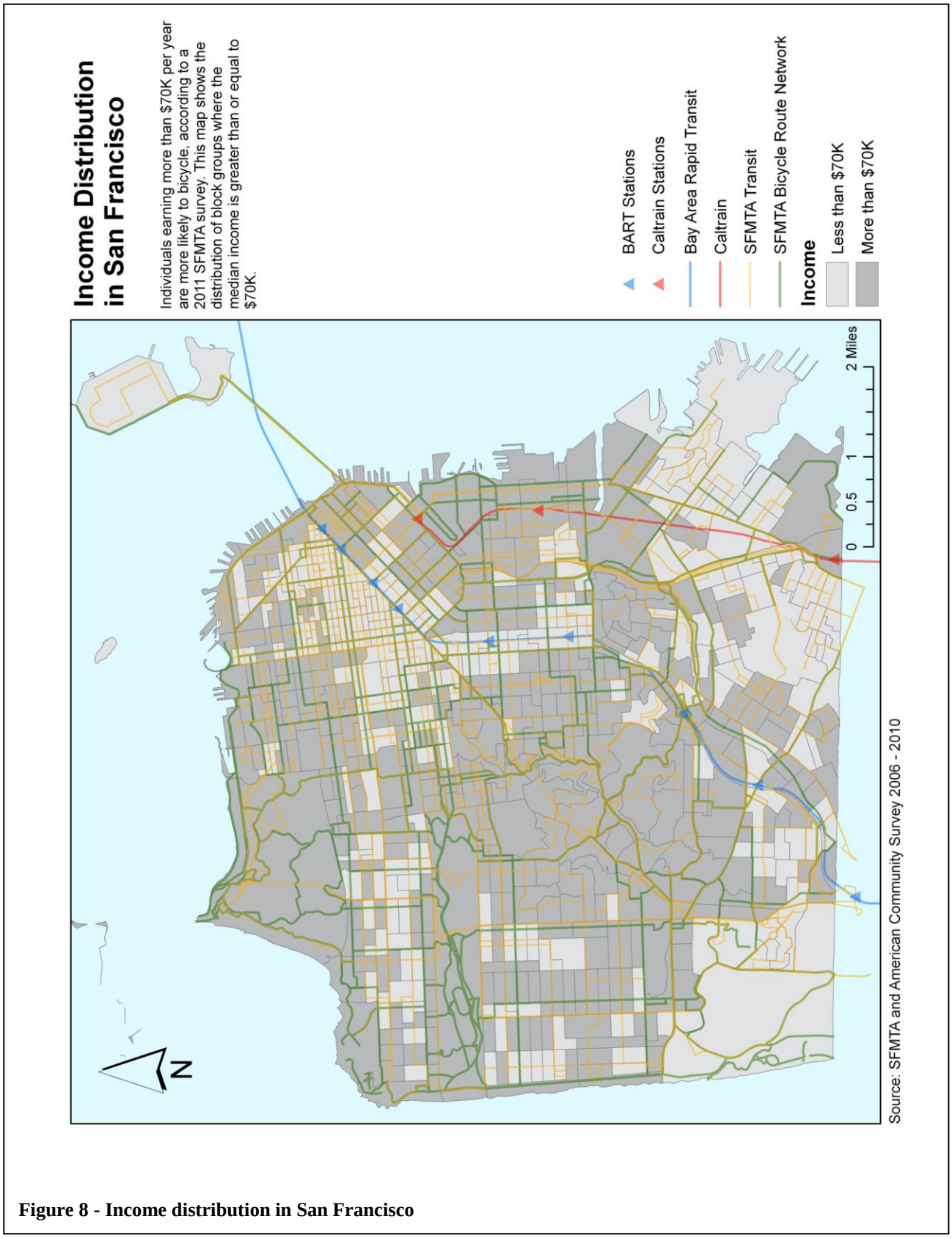


Figure 8 - Income distribution in San Francisco

Bicycle commuter distribution

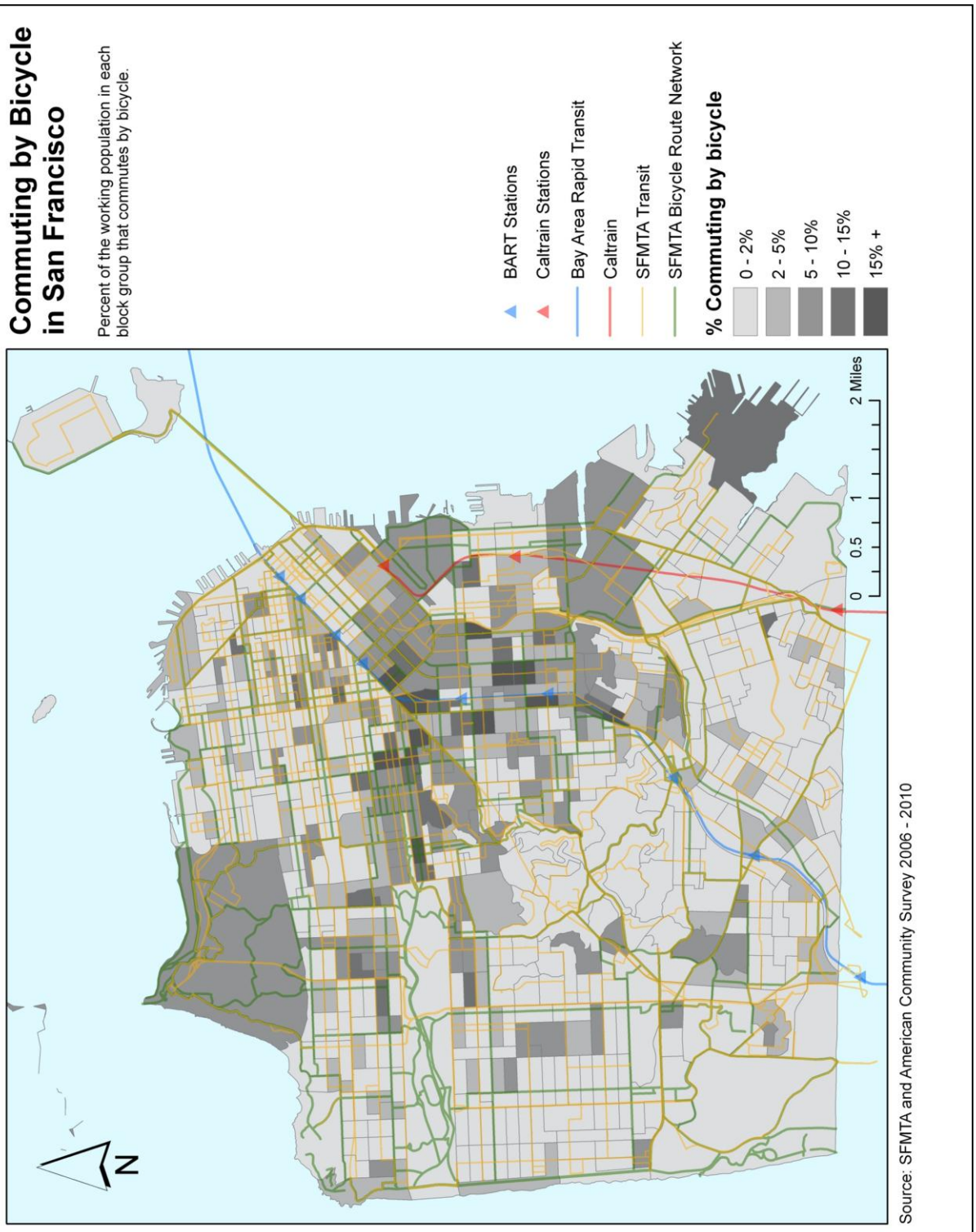


Figure 9 - Bicycle commuting in San Francisco

Transit commuter distribution

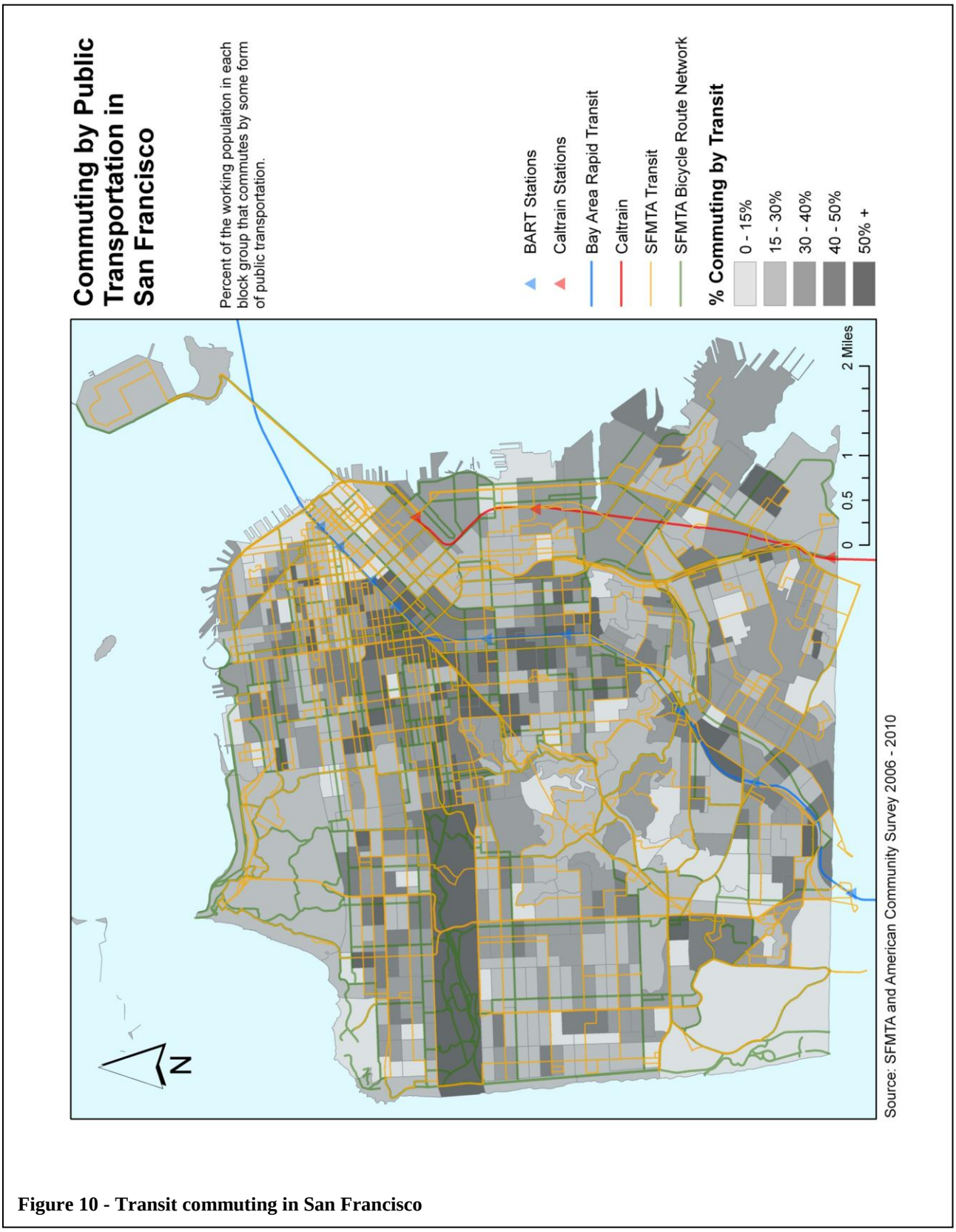


Figure 10 - Transit commuting in San Francisco

Dwelling units per acre

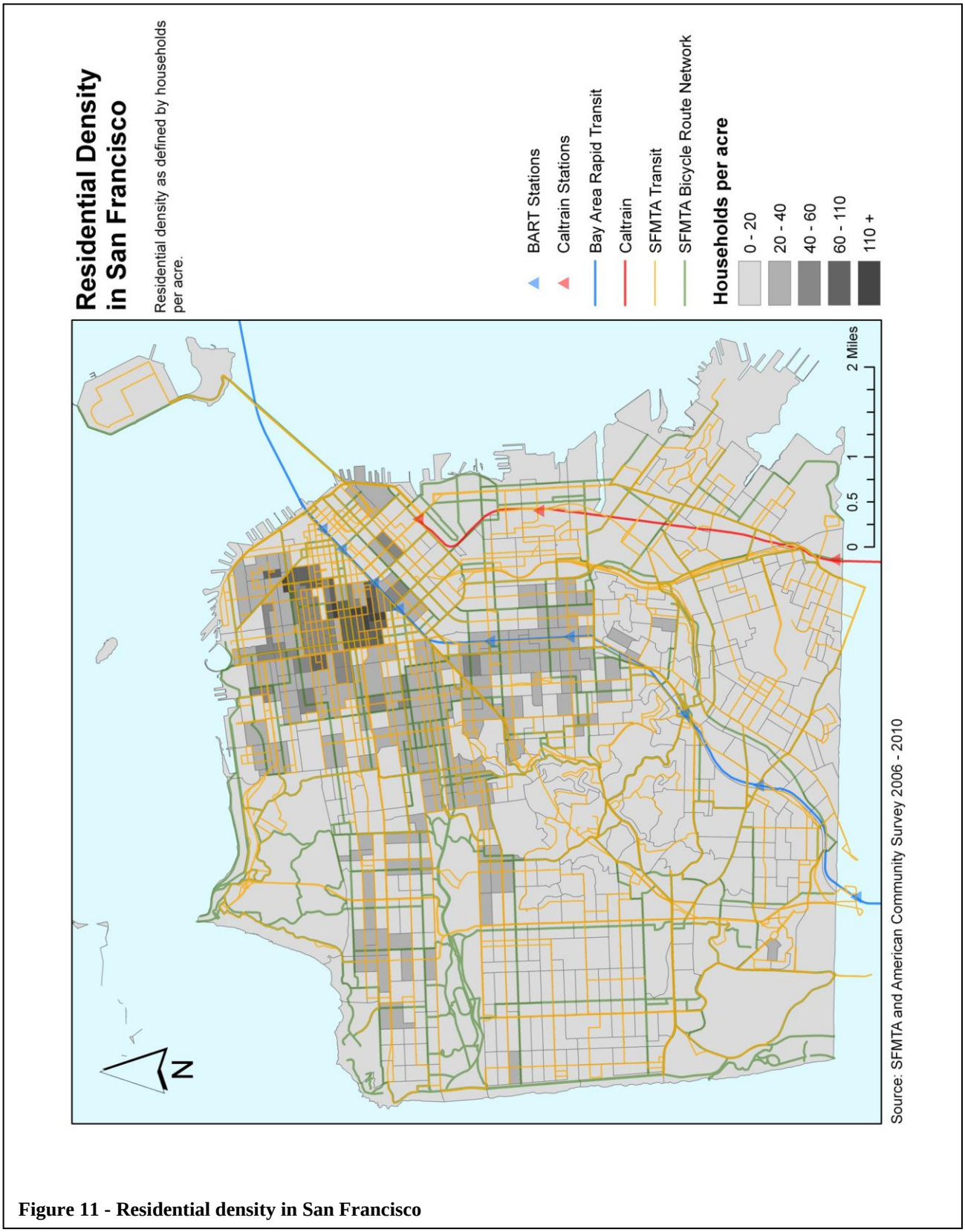


Figure 11 - Residential density in San Francisco

3. Polk Street

The citywide SFMTA bicycle-integration project will focus on several corridors in San Francisco; the remainder of this report focuses on just one of those. Given the existing citywide conditions discussed above, the focus was on Polk Street – a complement to Van Ness Avenue in the transit and bicycle networks. The Polk Street corridor presents several opportunities as well as challenges for bicycle-transit integration. A BRT line is currently being planned for Van Ness Avenue as mentioned above. Polk Street, running parallel one block east of Van Ness, is part of both the bicycle and transit networks. While the focus was on Polk Street, Van Ness Avenue was also considered where appropriate due to its proximity, regional importance, and planned transit changes. Figure 12 demonstrates Polk Street's importance in the bicycle network.

Following the map, the existing conditions of several important street, network, and built environment characteristics are reported for Polk Street. Bicycle counts, upcoming bicycle projects, transit network characteristics, 19-Polk frequency, boardings and alightings, 19-Polk bus stop characteristics, vehicular volume, intersection control, driveways, way finding signage, bicycle network characteristics, automobile parking, topography, street classification, geometric design, historic 5-year collisions, signal timing, zoning, way-finding signage, pedestrian volume, BSP street classification, and bicycle parking all were recorded in detail. A table with detailed descriptions of each of these parameters is in Appendix E – Detailed Existing Conditions.

The report uses pictures, illustrations, and text to describe the corridor as it exists currently. For simplicity, the corridor is organized into three segments – northern, central, and southern – that differ on surrounding land uses and right-of-way characteristics.

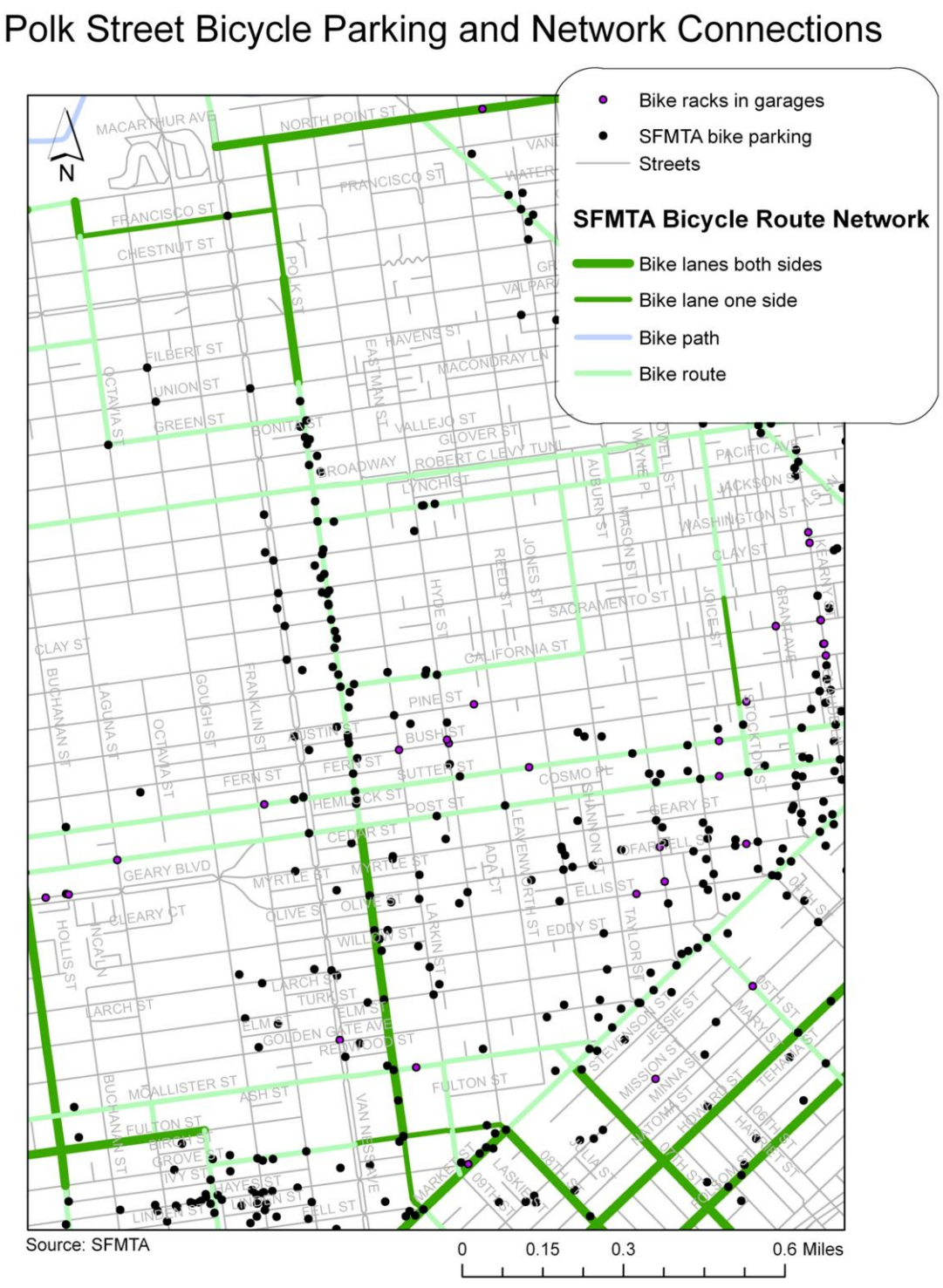


Figure 12 - Polk Street existing bicycle parking and bicycle network connections

3.1 Northern Polk Street: Beach Street to Filbert Street

Figure 14 - Northern Polk Street driveways (image credit: Terra Curtis)

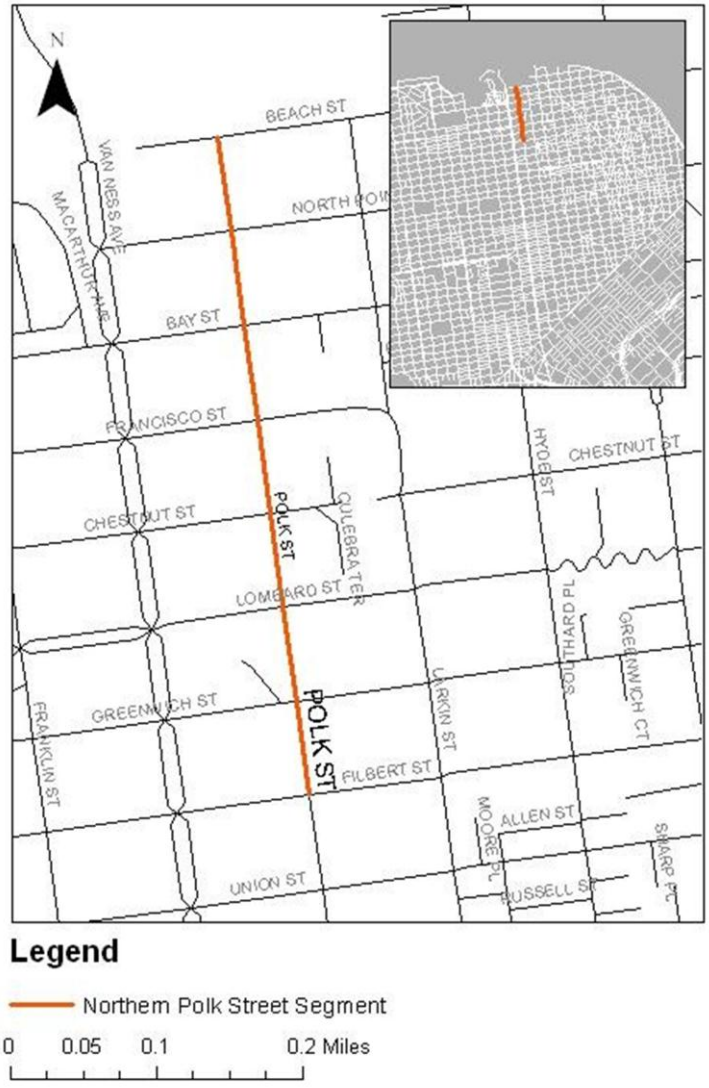


Figure 13 - Northern Polk Street Segment

The northern section of Polk Street is primarily residential; however the BSP classifies the area as mixed. The two northernmost blocks are considered Park Edge; the next two blocks are Residential Throughway, and the remaining three blocks are considered Commercial Throughway.

This classification comes along with a particular set of design guidance in the BSP (e.g. minimum sidewalk width, transition zones, provision of public open space, pedestrian scale lighting, and opportunities for neighborhood stewardship). As a result of this land use pattern, the northern blocks of Polk Street have an average of almost 15 driveways per block; three of those seven blocks have over 20 driveways. See Figure 14 for an example.

The residential character also means less activity on the street. A total of 122 bicyclists were counted at a northern intersection (Polk and North Point) in September 2011; this is approximately one third of the bicycle count totals in southern sections of the corridor.

Southbound transit boardings and northbound alightings of the 19-Polk are also low here, even though there are four southbound and four northbound stops in this seven-block section. The 19-Polk begins and ends at Polk and Beach with a bus stop on Beach Street. Additionally, there are

north- and southbound stops at the intersections of Polk and North Point, Polk and Francisco, and Polk and Lombard.

Vehicle volume is also low here; however, the latest measures are from 1995. These figures indicated that southbound traffic is slightly higher than northbound traffic (as measured at Chestnut Street). This information, though, is likely unreliable due to the length of time that has passed since it was collected. Anecdotally, traffic volume is much lighter in the northern segment than elsewhere.

In a separate project, pedestrian volumes had been modeled for all intersections citywide. As one might expect, estimated annual pedestrian volumes are lowest in this section of Polk Street as well. If ranked in order by estimated annual pedestrian volume, all eight of the intersections in this area of the corridor are in the bottom ten. Figure 14 shows the relatively low pedestrian volume, which anecdotally appears to be highest around school access times. Figure 15 was taken as children were leaving the Galileo Academy at Polk and Francisco.

Figure 15 - School-time pedestrian traffic, Polk at Bay Street (image credit: Terra Curtis)

Due to the low vehicle activity, most intersections here are stop-controlled. Only two of seven intersections are signalized – Polk at North Point and Polk at Bay Street. These two signal heads also include pedestrian countdown signals. At North Point, pedestrians crossing Polk on the south side of the intersection get a slightly longer walk phase than those crossing the north side due to an eastbound protected left-turn phase.

Most of Polk Street has a width of 44’-9” – enough in this section to include parallel parking on both sides, two travel lanes, and a 5’ bicycle lane in the southbound (uphill) direction. Given this width and its residential character, the BSP recommends considering corner curb extensions and marked crosswalks.

All but one of these seven blocks has unmetered parking (Beach to North Point is metered). There are no publicly-provided bicycle racks on Polk Street in this northern residential section.

Figure 16 - Northern Polk Collisions

This portion of Polk Street is steep; five of seven blocks have at least a five percent grade; three have greater than 10 percent. Bicycle lanes are provided on these blocks in the uphill direction; a continuous lane runs along the west side of the street along these seven blocks and east-side lanes begin at the two southernmost blocks of this segment. Two bicycle way finding signs were seen in this segment (signs marking bicycle routes 4 and 25 are located at Polk and Francisco).

Using the Statewide Integrated Traffic Records System (SWITRS), one can collect historical collision data. Information was pulled on historic bicycle-pedestrian, bicycle-transit, bicycle-automobile, pedestrian-automobile, and transit-pedestrian collisions for the 2006-2010 five year time period. This low-volume section of Polk Street saw only seven collisions in this five-year time period, and each of them involved an automobile. All but one occurred within an intersection (see Figure 16). The at-fault party in these collisions was mixed; the pedestrian, bicyclist, and driver were each at fault in at least one of the seven collisions. Appendix G – SWITRS Historic Collision Data includes a table of all the SWITRS data collected. The intersection of Polk with Bay Street was the scene of two collisions; this intersection is shown in Figure 15.

3.2 Central Polk Street: Filbert Street to Golden Gate Avenue

The central segment of Polk Street encompasses 20 blocks, much larger than the residential section to the north. The land use is primarily commercial, especially along the ground floor. Not surprisingly, the BSP classifies this segment as Commercial Throughway. Special consideration is needed here for high levels of pedestrian activity, transit function, and loading zones for local businesses. Also due to this land use, there are very few driveways (about 1.5 per block); only three blocks have more than three driveways. Still, curb space is in demand – because of its commercial nature, there is a high need for delivery access here. This may explain the use of sharrows rather than bicycle lanes in over half of the blocks in this section. Figure 18 shows sharrows on Polk at California and a delivery truck parked in the distance.

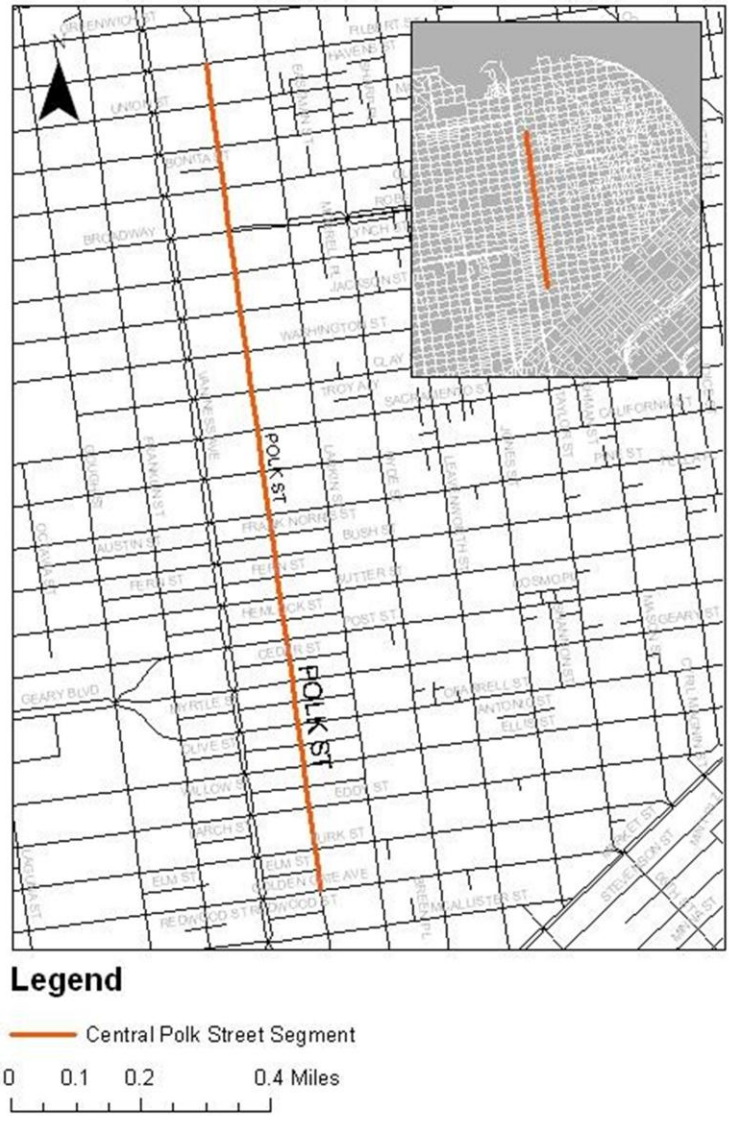


Figure 17 - Central Polk Street Segment

In contrast to the northern section, central Polk Street experiences a lot of activity. Of the 23 intersections in this section, seven have estimated annual pedestrian volumes of over 10 million people; the average is about 8.3 million. To put that figure into perspective: the northern section expects less than a tenth that volume annually.

The busiest pedestrian intersection is at Turk and Polk Streets, where the 16X-Noriega intersects with Polk Street, a southbound vehicle travel lane is added, an incline of 5-10 percent begins in the northbound direction, and the southbound 19-Polk leaves Polk to turn east on Eddy Street. The expected pedestrian volume here is almost double the next highest count (at Sutter and Geary Streets). The Polk and Sutter intersection also demonstrates high bicycle volumes relative

to the northern section of Polk; 336 cyclists were counted in September 2011 – triple that of the northern intersection where counts were conducted.

Figure 18 - Sharrows along Central Polk (image credit: Terra Curtis)

Vehicular traffic is relatively light here as well, but higher than in the northern section. In March 2009, average daily traffic at Broadway was 4,680 vehicles in the southbound direction and 5,351 in the northbound direction.

This approximately mile-and-a-quarter stretch of Polk Street also has several transit stops. There are both south- and northbound stops at Union (no shelters), Green (no shelters), Broadway (southbound shelter), California (shelters), Pine (shelter southbound), Sutter (shelters), and Post (no shelters). There are northbound-only stops at Pacific (shelter), Washington (shelter), and Sacramento (no shelter). Southbound-only stops are located mid-block between Jackson and Washington (bulb-out, no shelter), between Clay and Sacramento (bulb-out, shelter), at O'Farrell (no shelter), and at Eddy (on Eddy, no shelter). See Figure 19 and Figure 20.

Figure 19 - Bus stops and sharrows on Polk at Sutter (image credit: Terra Curtis)

Figure 20 - Bus stops blocking most of vehicle and bicycle travel lane, Polk at Pine St (image credit: Terra Curtis)

Transit boardings at most stops along this section of Polk are much higher than alightings in the southbound direction, both in the AM and PM peak travel period. This holds true at every stop except for the southbound stop at Polk and Eddy. This is where the 19-Polk route leaves Polk Street. There, alightings outweigh boardings in both AM and PM periods. In the northbound direction, this pattern was also seen – alightings are always much higher than boardings in both

peak periods. This pattern suggests that passengers are using the 19-Polk to access downtown primarily, and most of the northbound passengers are using the 19-Polk to access the commercial zone.

The curb-to-curb width through this section also is 44'-9" with two travel lanes, one in each direction. On the northern-most block (between Filbert and Union), there are 5' bicycle lanes on either side of the street. However, moving southward, though this 44'-9" width is maintained, sharrows are employed rather than bicycle lanes. At Geary, Polk widens slightly to 48'-9" and a 13' shared bicycle lane/parking lane is used on both sides of the corridor through to Turk Street. At Turk, the last intersection of this segment, the 48'-9" width includes 2-5' bicycle lanes; on the west side of the street, this lane abuts an 8' parking lane; on the west side the 5' lane runs curbside. Figure 21 shows how overlapping the bicycle and parking lane induces a bicyclist to ride closer to the lane of traffic.

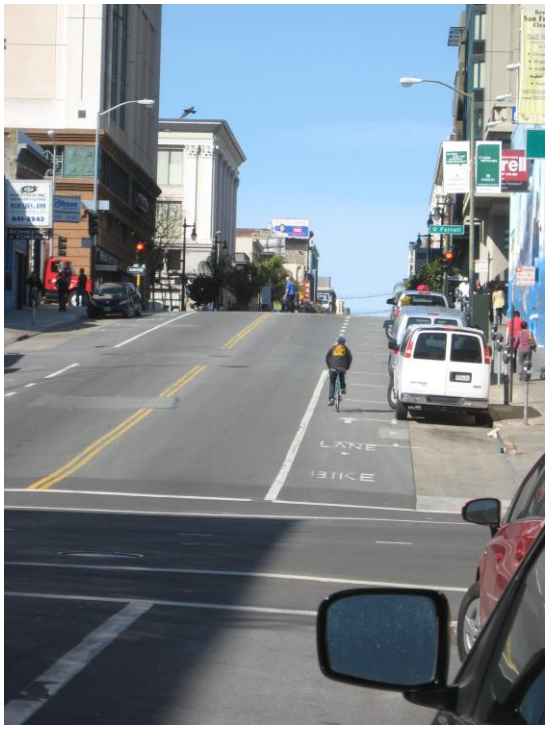


Figure 21 - Bicycle lane and parking lane overlap, Polk between Ellis and O'Farrell (image credit: Terra Curtis)

Bicycle way finding signs are located at Pacific and Post Streets in the northbound direction.

This central segment of Polk has metered parallel parking along its length with 7'-8' parking lanes; there is one block (between Turk and Golden Gate Avenue) with metered parallel parking on the west side only. The east side of the street is bordered by the Phillip Burton Federal Building, and no on-street parking is allowed along its façade. On-sidewalk bollards guard the sidewalk and building from the street right-of-way.

On-street bicycle parking is prevalent in the central segment. As of January 2011, there were 60 SFMTA-installed bicycle racks along this section of Polk. They are distributed fairly evenly between Union and Post Streets, with a more sporadic pattern to the south between Post and Golden Gate Avenue. These racks are inverted-U type racks and are not protected from the weather. The most-northern block of the central section (between Filbert and Union) has no racks; the southernmost block (between Turk and Golden Gate Avenue) is also without racks.

The topography along this commercial segment is amenable to biking. Slopes never rise above 10 percent. The crest of the hill over which Polk runs is in this segment as well, between Jackson and Sutter Streets.

As one might expect, there have been more bicycle, pedestrian, and transit-related crashes in this higher-volume segment of Polk Street (collisions have been aggregated by intersection in Figure 22 because of the scale of this map). Between 2006 and 2010, a total of 90 bicycle-pedestrian, bicycle-transit, transit-pedestrian, auto-bicycle, or auto-pedestrian crashes occurred here. Transit vehicles were involved in five of these 90 – however only one of these involved a regular Muni vehicle. The other four collisions involved a private transit vehicle.

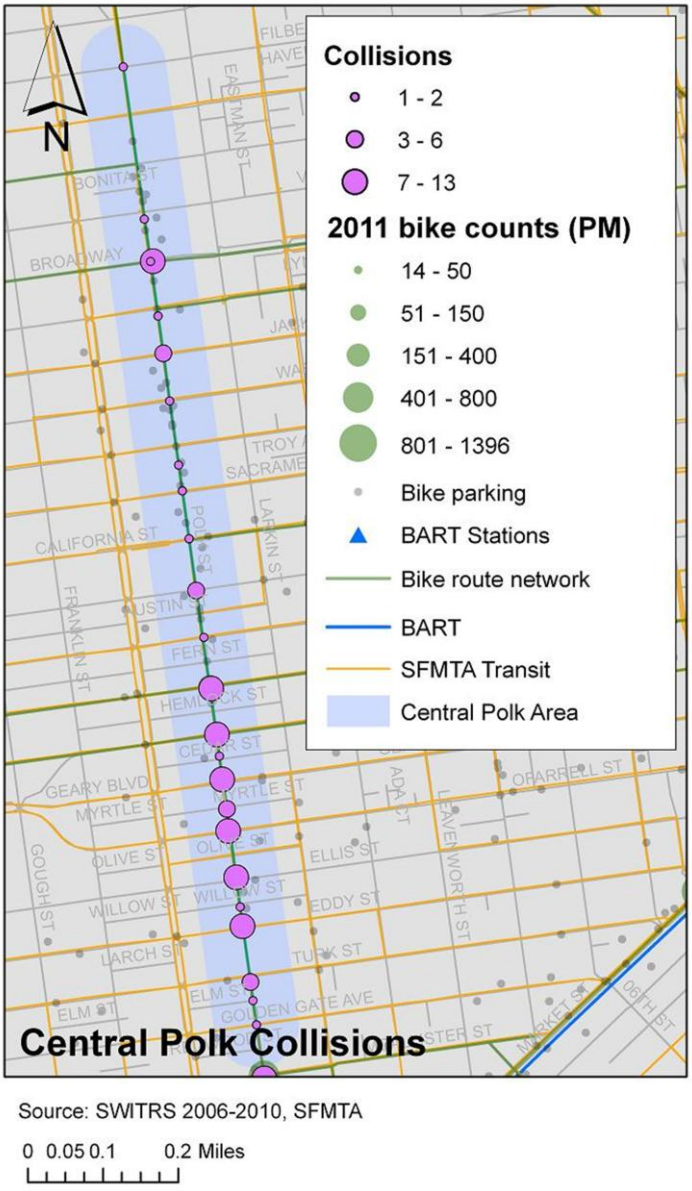


Figure 22 - Central Polk Collisions

Almost all other collisions in this segment involved an automobile (with either a pedestrian or bicyclist). The one that did not was a pedestrian-bicyclist collision at Geary and Polk. The bicyclist was traveling south along Polk and the pedestrian east along Geary; the pedestrian had jaywalked into Polk Street. The collision occurred at midnight.

One particularly concerning intersection is at Polk and Turk Streets. This intersection alone saw five collisions in the 2006-2010 five year time period. As noted before, Polk/Turk is the busiest pedestrian intersection along Polk; however, only one collision involved a pedestrian (and the pedestrian was at fault). The other four collisions each involved a bicycle and an automobile. In three of those four, the driver was at fault and the bicyclist had been proceeding straight.

The intersections with Broadway, Eddy, Ellis, Geary, O'Farrell, Pine, and Post Streets also saw many collisions in this time period. Again, most of these collisions involved an automobile. The full details are available in the table in Appendix G – SWITRS Historic Collision Data.

3.3 Southern Polk Street: Golden Gate Avenue to Market Street

The southern segment of Polk Street is diverse from a land use point of view. The street name itself transitions temporarily from "Polk Street" to "Dr. Carlton B. Goodlett Place" as it runs through Civic Center in front of City Hall; much of this segment of the street contains public buildings. The BSP classifies this segment as mixed. Between Golden Gate and McAllister and between Grove and Market, Polk Street is considered Downtown Commercial; between McAllister and Grove, there is a special overlay called Ceremonial/Civic, which highlights the area's public and governmental character.

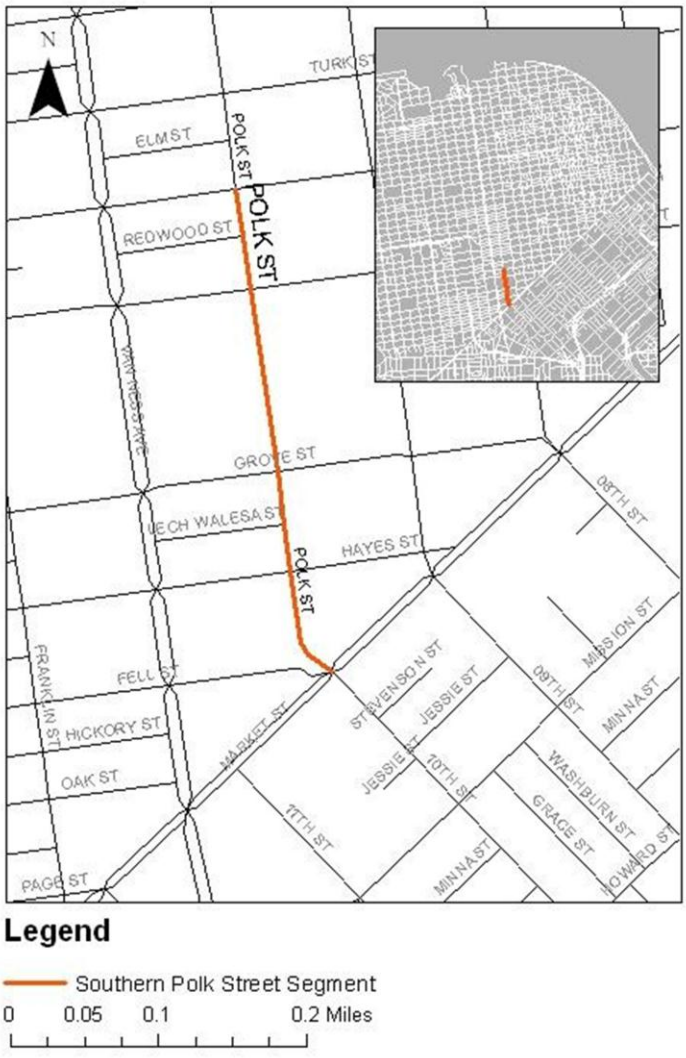


Figure 23 - Southern Polk Street Segment

The block between McAllister and Grove Streets, where City Hall is located, has an extremely different character from all other blocks – one side of the street is public open space, so the sense of enclosure found along the rest of the corridor is lost (see Figure 24). At Grove Street, Polk becomes one-way southbound until it terminates at Market Street. Given these land uses and right-of-way characteristics, there are very few driveways. This four-block section has an average of two driveways per block.

Being the civic center of the city and given the pattern of more southbound than northbound traffic, activity in this segment of Polk Street is high. Average estimated annual pedestrian volume for this four-block segment is similar to that of the 23-block central segment at 6.8 million pedestrians per year. The September 2011 afternoon bicycle count revealed 497 bicyclists at Polk and McAllister and 393 at Polk and Grove. Additionally, 20 percent of those 393 bicyclists were observed riding illegally – wrong-way riding, wrong-way sidewalk riding, and sidewalk riding. The most recent traffic count in this segment comes from a Friday in

January 2007; 14,396 southbound vehicles were counted at Polk and Hayes – the highest count of any on record for Polk Street.

Figure 24 - The constrained Polk Street right-of-way opens up here, looking south to Dr. Carlton B. Goodlett Place (image credit: Terra Curtis)

The 19-Polk does not run along this southern segment (southbound 19-Polk exits Polk at Eddy; northbound service rejoins Polk Street at Geary), but the 21-Hayes runs south on Polk for the last two blocks between Grove and Market Street. There is one 21-Hayes stop on Grove at Polk with no bus shelter; in both the AM and PM peak periods, alightings far outweigh boardings here, though neither measure is very high. On average, automatic passenger count data from 2006-2007 revealed two boardings and 14 alightings in the AM peak, with one boarding and 11 alightings in the PM. There are no transit stops on Polk in this southern segment.

In addition to the land use changes in this section, the right-of-way design also exhibits a deviation from the rest of Polk Street. Here, the 5' bicycle lane continues southbound, however there are no northbound bicycle facilities (note: south of Grove is one-way southbound). There is a prominent continental crosswalk installed in the mid-block of Goodlett Place that leads to City Hall. The 48'-9" right-of-way between Golden Gate and McAllister widens to 71' as Goodlett Place passes in front of City Hall. This wide block includes two-11' southbound vehicle lanes, a 9' curbside parallel parking lane, and a 5' bicycle lane between the two. The northbound side includes one travel lane and a lane of angled parking. The 5' bicycle lane is maintained (though it shrinks to 4' in one half-block section) through the 2-block one-way segment. The two southbound travel lanes are continued. The total width in the one-way segment returns to 48'-9".

Figure 25 - Existing southbound bicycle lane on southern Polk Street (image credit: Terra Curtis)

A contra-flow bicycle lane is expected to be implemented in fiscal year 2013/2014 on Polk Street between Market and Grove (Figure 25), extending the bicycle lanes through to McAllister Street (adding northbound bicycle facilities) and connecting with the existing bicycle lane that starts at McAllister heading northward.

Automobile parking is limited in this section. The block between Golden Gate and McAllister has no parking on

the eastern edge and a drop-off zone on the western edge. In front of City Hall, there are a few parallel spaces on the western side of the street and angled parking on the eastern edge. South of City Hall, between Grove and Hayes there is additional parallel parking, and the terminating block between Hayes and Market includes parallel parking along the west side of the street. On-street bicycle parking is less plentiful in this section, but generally racks are provided near intersections. There are 10 racks in all.

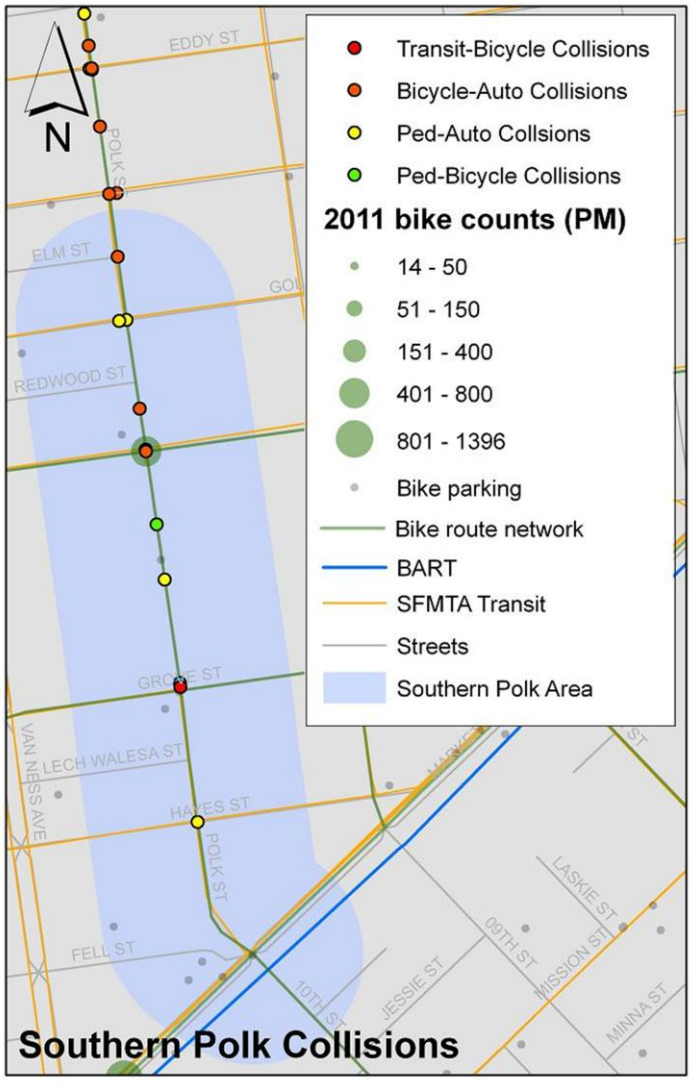


Figure 26 - Southern Polk Collisions

The topography in the southern segment is very amenable to bicycling. There are no grades greater than five percent and the slope is slightly southward – in the direction of the one-way travel.

This four-block segment saw 12 collisions in the 2006-2010 time period (see Figure 26). These collisions were mixed between bicycle-auto, pedestrian-auto, pedestrian-bicycle, transit-bicycle, and transit-pedestrian. Again, the most represented crash type involved an auto. The other collisions exhibited mixed causes. Of the two pedestrian-bicycle crashes, one was the fault of the pedestrian and the other the fault of the bicyclist. Of the two transit-involved crashes, one was the fault of the driver who collided with a bicyclist and the other the fault of a pedestrian. Neither of these two collisions involved SFMTA transit vehicles.

The most concerning intersection is Polk at McAllister – eight of 12 collisions occurred at this intersection. Three of the eight occurred in dark conditions and only half of the auto-involved collisions were the fault of the driver. Figure 24 shows this intersection looking southbound.

3.4 Summary of Existing Conditions

3.4.1 General

- Repaving scheduled in 2013
- 19-Polk buses all equipped with two front-loading bicycle racks

3.4.2 Bicycle network

- Polk Street is the main north-south route in this neighborhood
- More bicycle lanes are provided in the southbound direction; northbound there are more sharrows or lack of markings altogether
- Bicycle lanes are provided on uphill segments
- The bicycle lanes are intermittent with sharrows mostly between
- Many bicycle lanes lack right-side edge lines, sharing space with parked cars
- There is an upcoming project to implement contra-flow bicycle lanes between Market and Grove Streets and extend a bicycle lane from Grove to McAllister

3.4.3 Bicycle volumes

- Moderate bicycle volumes as compared with citywide bicycle counts
- Higher bicycle volumes as you go south along Polk Street
- Unrealized potential as a major north-south connection for bicyclists

3.4.4 Bicycle parking

- On-street parking provided in central and southern segments
- Garage parking available nearby (see Figure 4)

3.4.5 Automobile parking

- Three city-owned off-street parking garages near Polk Street (most spaces available in Southern Segment of Polk Street)
    - Polk Bush Garage at 1399 Bush @ Polk (129 spaces)
    - Civic Center Garage at 355 McAllister @ Polk (843 spaces)
    - Performing Arts Garage at 360 Grove Street (3 blocks west) (618 spaces)
- 417 metered parking spaces along Polk Street
    - 70 percent are general metered parking, 15 percent are for commercial loading, 9 percent are motorcycle-only
    - Remaining spaces are split between disabled parking, short-term (up to 30 minutes), and on-street bicycle parking and seating areas

3.4.6 Transit network

- Polk Street runs parallel to Van Ness/Highway-101 and upcoming Van Ness BRT; it is a supportive bicycle and transit route
- The 19-Polk travels along the northern and most of the central segments; the 21-Hayes runs along Polk's southernmost section

- There are many transit stops along the corridor, some with, some without shelters. Some mid-block and corner bulb-outs are provided on west side of street.

3.4.7 Transit frequency

- 19-Polk Schedule
    - first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am
- On-time performance
    - As of 2006, the following running time was observed on the 19-Polk (Andrew Lee, SFMTA staff, personal communication, February 24, 2012). Note that the SFMTA standard for on-time performance is no more than one minute early or four minutes late. Out-of-compliance figures are highlighted by a special cell border in the table.

Table 6 – 19-Polk on-time performance

Route Segment	Direction	Deviation from Schedule (minutes)*		
		AM Peak	Midday	PM Peak
Beach/Polk to Sacramento/Polk	Southbound	1.9	0.7	1.4
Beach/Polk to Sacramento/Polk	Northbound	3.6	2.9	3.4
Sacramento/Polk to Post/Polk	Southbound	-1.6	-1.0	-1.0
Sacramento/Polk to Post/Polk	Northbound	-2.3	-2.6	-2.3

* positive number reflects minutes behind schedule; negative number reflects minutes ahead of schedule

    - Northbound 19-Polk between Post and Sacramento Streets exhibits the least reliability. Northbound between Sacramento and Beach operated within the standard for on-time performance, however the AM and PM peak periods approach the upper limit of acceptability. The segment between Sacramento and Beach tends to run behind schedule in both the north-and southbound directions; the segment between Post and Sacramento tends to run ahead of schedule in both the north- and south-bound directions.

3.4.8 Transit boardings/alightings

- Most people traveling southbound are going to Market Street/downtown
- Most people traveling northbound are going to central Polk/commercial area
- A chart of 19-Polk boardings and alightings from September/October 2010 is provided as Appendix C – 19-Polk Ridership.

3.4.9 Vehicular volume

- Generally speaking, there is more southbound than northbound traffic; the only intersection where northbound traffic is higher than southbound is at Broadway. In most other cases, southbound traffic far outweighs northbound.
- Polk is not a critical vehicular connection (Van Ness/Highway-101 runs parallel one block to the west)

3.4.10 Intersection control

- Intersections are mostly signalized; some stop-controlled in northern residential section

3.4.11 Signal timing

- No green wave or special timing for transit along Polk St. (based on Staff conversations – Valencia and 11th Streets are green wave; Geary is timed for transit)

3.4.12 Driveways

- There are fewer driveways as you head south on the corridor into the commercial areas
- There are no designated loading areas for commercial deliveries

3.4.13 Collision History

- Most collisions involve an auto, especially in the central segment
- "Dooring" (a collision where an automobile driver or passenger opens their door in the path of a passing bicyclist) appears to be a common collision type
    - Polk @ Vallejo: 6/25/2009
    - Polk @ Pine: 11/7/2008
    - Polk @ Jackson: 3/8/2010
    - Polk @ Eddy: 10/20/2010
    - Potentially Polk @ O'Farrell: 10/23/2009
- Over 40% of collisions happened in "Dark – Street Light" conditions
- Particularly concerning intersections for bicyclists include
    - Geary Street, Broadway, Ellis Street
- Particularly concerning intersections for pedestrians include
    - Pine Street, O'Farrell Street, McAllister Street

3.4.14 Geometric design

- Bus bulb-outs are provided only on western side of street, only at some transit stops
- Polk Street is mostly a ~45-50' right of way with parallel parking either side; Goodlett Place opens to 71'
- Sidewalks are typically 10-12'

3.4.15 Zoning/Land Use

- Mixed land uses – residential in northern segment, commercial in central segment, public uses in the southern segment

4. Needs Assessment

Existing conditions were synthesized to identify the gaps between the status quo and those conditions under which the study's goals would be met. In order to illustrate that link, the needs that result from the synthesis were linked to corresponding goals. The needs form the basis of recommendations presented later in this report.

The issue areas were examined on three different scales: the Polk Street corridor and neighborhoods; specific point locations; and the broader citywide context.

4.1 Corridor and neighborhood needs

The overall Polk Street corridor has several needs that, if addressed, would further the achievement of the four main goals of bicycle-transit integration. Needs were matched to those goals that would be primarily or secondarily addressed by focusing investment in that need area (Table 7 through Table 9).

Table 7 – Corridor and neighborhood needs

Need	Goals
Clearer delineation of space Polk Street is shared among Muni buses, bicyclists, pedestrians, and automobiles. It is not a primary corridor in the automobile or transit networks; however, it is the only north-south bicycle connection in this neighborhood and will become an increasingly important support to Van Ness Avenue as a major bicycle throughway. Pedestrian activity is also high here because of the corridor's commercial character and proximity to transit lines. The physical layout of the street does not reflect the needs of these four user groups; the quality of the bicycle route has been compromised by the prioritization of automobile access. Transit reliability is questionable, especially in the northbound direction between Post and Sacramento Streets (ahead of schedule) and from Sacramento to Beach (behind schedule). Any recommendations for changes to the delineation of space need to take this performance into account so as not to exacerbate an existing problem.	Goal 1: Improve pedestrian and bicyclist safety Goal 2: Alleviate crowding on Muni Goal 3: Increase bicycle and transit mode share Goal 4: Prioritize transit reliability
Bicycle access As a commercial corridor, Polk Street needs to be supported by ample short-term bicycle parking. Local businesses have driven the requests for bicycle racks on this corridor; therefore, there has not been broad, strategic thinking about parking placement and supply. A corridor walk revealed a few bicycles parked to meter poles or sign posts; the most concentrated (and heavily used) bicycle parking is located outside the Superior Court Building at Polk and McAllister.	Goal 3: Increase bicycle and transit mode share

Additionally, Polk Street will need to support the future users of the Van Ness BRT. As a BRT corridor, Van Ness itself will need to prioritize longer-term, secure bicycle parking to enable to bicycle as an access/egress mode. It is likely that bicycle sharing stations will eventually be used to support the BRT line as well; Polk Street's commercial section needs to be supported by at least one bicycle sharing station as a complement to Van Ness.	
Safety improvements throughout central and southern Polk Bicycle-pedestrian and bicycle-transit collisions are concentrated in the southern half of Polk Street. Overall, collisions involving automobiles are the most common, and often a right or left turning movement is involved. The central and southern segments see most of the corridor's pedestrian and bicyclist activity, so collisions should be expected more frequently here. Pedestrian scale lighting may be needed; many collisions occur under conditions of darkness. Additionally, there are no protected bicycle facilities anywhere along this corridor. If increases in bicycling, walking, and transit use are to be realized (which is the goal of the SFMTA), then these patterns can only expect to continue unless preventative action is taken.	Goal 1: Improve pedestrian and bicyclist safety Goal 3: Increase bicycle and transit mode share
Enhanced bicycle network connections Currently, several bicycle routes intersect with Polk Street, however only a few of those routes are Class II facilities (bicycle lanes); the others are Class III routes only (usually marked by sharrows). Bicycle connections specifically between Van Ness and Polk Street should be enhanced. One important connection is along Green Street, which would connect the northern Polk residents to the northernmost BRT stop at Union Street. Other important connections in the central segment of Polk include Broadway, Sutter, and Post Streets. These connections could support the future BRT and bicycle sharing systems, and provide additional bicycle traffic to the Polk Street commercial zone. They could also help alleviate crowding on north-south transit routes serving this dense residential neighborhood by providing more visible, comfortable, and safe bicycle network connections.	Goal 1: Improve pedestrian and bicyclist safety Goal 2: Alleviate crowding on Muni Goal 3: Increase bicycle and transit mode share
Enhanced bicycle network along Polk Street Bicycle facilities on Polk Street currently transition between Class II and III facilities; the quality of the route is not consistent throughout though the road geometry is fairly uniform. In order to become a clear complement to the future Van Ness BRT corridor, serve some of the north-south demand, and enhance access to local businesses, the bicycle route along Polk Street should be enhanced. Timing of signals could be considered to aid the flow of bicycle traffic.	Goal 1: Improve pedestrian and bicyclist safety Goal 2: Alleviate crowding on Muni Goal 3: Increase bicycle and transit mode share
Consideration of automobile parking San Francisco's innovative parking pricing pilot project, SFPark,	Goal 3: Increase bicycle and transit mode share

provides a mechanism for learning about, planning for, and managing parking demand. Unfortunately, this program currently only covers the southernmost blocks of Polk Street. A deeper analysis of Polk Street automobile parking demand needs to be carried out, which could support making enhancements to the bicycle network and improving transit efficiency on this corridor.	Goal 4: Prioritize transit reliability
Way finding signage Bicycle route signage along Polk Street points riders to several destinations such as Fisherman's Wharf, the Cliffhouse, Downtown, and the Marina. However, this signage is small, is at a great sight distance for bicyclists, and no signage guides bicyclists to nearby transit services (e.g. connecting routes, future BRT service) or parking facilities (e.g. bicycle racks and lockers in nearby garages).	Goal 3: Increase bicycle and transit mode share
Transit stop enhancements Shelters for waiting passengers are provided at some bus stops along Polk Street, however many stops are without amenities. There is a need for transit service information to be provided at all stops. Way finding information for alighting passengers with bicycles could be used to guide these passengers to nearby parking facilities. A future need will be way finding information about nearby bicycle sharing stations. Shelters, especially in the southbound direction where most people are waiting to board, are also needed at several stops.	Goal 1: Improve pedestrian and bicyclist safety Goal 3: Increase bicycle and transit mode share

4.2 Point and station needs

In addition to corridor-long and neighborhood-specific needs, several focused points along Polk Street warranted attention. Most of these points were cause for concern due to their history of collisions, however a few other point and station needs were noted that relate to improving pedestrian, bicyclist, and transit passenger experience generally.

Table 8 – Point and station needs

Segment	Intersection	Need	Goal
Northern	B/n Beach and Lombard (NB)	Sharrows or other prominent signification of the bicycle route	Goal 1 Goal 3
	@ Filbert	Examination of 4-way stop as intersection control device. This intersection is the first northbound intersection without signalization. One bicycle-auto broadside severe injury collision here.	Goal 1
	@ Francisco	Examination of 4-way stop as intersection control device. This intersection is the first southbound intersection without signalization. One bicycle-auto broadside complaint of pain	Goal 1

		collision here.	
Central	@ Eddy	Only southbound 19-Polk stop with more alightings than boardings (but similar numbers of each) – potential site for a bicycle sharing station as this stop appears to be a node (many people start or end their transit journey here).	Goal 2 Goal 3 Goal 4
	@ California @ Sutter Mid-block b/n Broadway and Pacific	Both north- and southbound bus stops at these intersections have high use relative to other Polk Street stops – potential sites for bicycle sharing locations	Goal 2 Goal 3 Goal 4
	@ Union (NB) @ Vallejo (SB) @ Post @ O'Farrell Mid-block b/n Jackson and Washington	Bus shelters at these southbound stops needed. Most passengers board in the southbound direction, meaning passengers are more likely to be waiting without a shelter here.	Goal 1 Goal 3
	@ O'Farrell	Potential future intersection of Geary BRT line; need to consider connections with bicycle sharing system here	Goal 2 Goal 3 Goal 4
	B/n Broadway and Jackson	Increased bicycle parking	Goal 2 Goal 3
	B/n Post and O'Farrell	Increased bicycle parking	Goal 2 Goal 3
	B/n Eddy and Turk	Increased bicycle parking	Goal 2 Goal 3
	@ Broadway	Safety enhancements for bicyclists. Five of six bicycle-auto collisions here were the fault of the driver, usually performing a turning movement. Four of those five occurred in darkness. (Note: there is a policy discussion underway to move the Broadway bicycle route to Pacific).	Goal 1
	@ Ellis	Enforcement, timing of lights for southbound bicyclists, or reminders to southbound bicyclists to stop on red light. Several bicycle-auto collisions here were the fault of the bicyclist.	Goal 1
	@ Geary	Safety intervention for southbound bicyclists. Most bicycle-auto collisions here are the fault of the driver making a turning movement in the way of a southbound bicyclist.	Goal 1
	@ Pine	Safety considerations for alighting passengers at Pine Street south- and northbound stops. Four of five collisions here were pedestrian-	Goal 1

		auto collisions; all of those were the fault of the driver who violated the pedestrian right of way as they crossed Polk Street heading east.	
	@ Post	Safety considerations for alighting passengers at Post Street south- and northbound stops.	Goal 1
Southern	b/n McAllister & Grove	Provision of on-road bicycle facility in northbound direction Increased bicycle parking	Goal 1 Goal 2 Goal 3
	@ McAllister	Need for safety enhancements. Eight of twelve southern segment collisions occurred at this intersection; all five types of collisions occurred at least once.	Goal 1 Goal 3
	@ City Hall @ Market	Potential bicycle sharing station. Bicycle connections to Van Ness BRT along McAllister and Grove.	Goal 1 Goal 3
	@ Market	Way finding signage needed to direct bicyclists to future contra-flow bicycle lane, proximity to Van Ness BRT, nearby garage bicycle parking.	Goal 3

4.3 Citywide needs

While not the explicit focus of this study, some preliminary city- and system-wide needs were identified using the information gathered on existing plans, policies, and projects. These topics will be developed further as part of the SFMTA's full bicycle-transit integration project.

Table 9 – Citywide needs

Need	Goal
Official bus operator policy on interactions with bicyclists in the roadway and education worked into operator training on these interactions	Goal 1 Goal 3
Communication with private shuttle operators to promote the use of SFMTA operator, bus-bicycle interaction, and bicycle-racks-on-buses policies	Goal 1 Goal 3
Monitoring and tracking of non-infrastructure bike plan action items. The current lack of tracking suggests that the Bicycle Plan Action Items related to bicycle-transit interaction may not be prioritized or implemented.	Goal 1 Goal 3 Goal 4
Coordination between SFMTA, the future bicycle sharing program vendor, and the SFCTA's BRT planning team to integrate payment and information systems, bicycle share station location, and bicycle parking near stops.	Goal 1 Goal 2 Goal 3 Goal 4
The passage of the Bicycle Access and Safety Ordinance, sponsored by	Goal 3

Supervisor Avalos	
Consideration of bicycle access to transit in the SFMTA's current Bicycle Strategy planning phase. In the Bicycle Strategy, several tactics are suggested for increasing San Francisco's bicycle mode share to 20 percent by 2020. The suggested strategy thought to contribute most to mode share is a drastic investment in premium bicycle facilities (such as cycle tracks and bicycle boulevards). The spatial distribution of these new, upgraded facilities should prioritize access to and safety near major transit lines.	Goal 1 Goal 3 Goal 4
More secured bicycle parking near transit and the downtown core (e.g. covered parking, lockers, and bicycle stations)	Goal 2 Goal 3
Pilot phase of allowing bicycles on light rail to study effects on passenger safety, transit crowding, and transit reliability.	Goal 3 (and understand effects on Goals 1, 2, 4)

5. Literature and current practice review

5.1 Introduction

To inform strategic recommendations for improved bicycle-transit integration in San Francisco, other cities' practices and researchers' recommendations were surveyed.

Bicycle-transit integration is a relatively new area in transportation planning and research (Krizek & Stonebraker, 2010b; Bachand-Marleau, 2011). As noted in the motivations for this study, the integration of the two modes is worthwhile to cities because it increases both the likelihood of bicycling and of transit use, extends the catchment area of transit at lower cost than neighborhood feeder buses and automobile park-and-ride facilities, provides an alternative to transit, and offers a back-up for bicyclists who encounter bad weather, mechanical problems, or other unforeseen barriers to bicycling. If implemented efficiently, bicycle-transit integration can alleviate congestion on particular transit lines or at specific times of day while simultaneously increasing transit use in general through combination with the bicycle mode.

Bicycle-transit integration is becoming increasingly necessary as well; bicycling to work increased 32 percent between 1990 and 2007 in the U.S. while transit ridership increased 38 percent between 1995 and 2008 (Pucher & Buehler, 2009).

In the United States, current strategies include bicycle-on-bus, bicycle-on-train, and transit station bicycle parking solutions (Schneider, 2005; Pucher & Buehler, 2009), with 72 percent of U.S. public transit buses equipped with bus racks (Pucher, Dill & Handy, 2010).

In Europe, there are higher bicycle and transit mode shares and as such, the solutions operate on a larger scale and are more comprehensive (e.g. high-volume bicycle parking at rail stations (facilitating the access trip), short-term bicycle rental services (facilitating the egress trip), and physical separation of on-street bicycle and transit lanes (Pucher, Dill & Handy, 2010; Perkins + Will, 2011).

In China, a new BRT system was developed with a bicycle sharing program as an integral component in Guangzhou (Press, 2011).

Across the world, the main bicycle-transit integration strategies include the following six categories (Pucher & Buehler, 2009; Bachand-Marleau, Larsen & El-Geneidy, 2010, Bachand-Marleau, 2011; Bike Sharing Blog[8]):

(1) Bicycle racks on the exterior of buses
(2) Bicycles on board vehicles (buses and rail), which can include racks, hooks, or whole cars dedicated to bicycle storage;

8

http://maps.google.com/maps/ms?msid=214135271590990954041.00043d80f9456b3416ced&msa=0&ll=43.389082,-89.912109&spn=32.256121,79.013672

(3) Bicycle parking at rail stations and bus stops;
(4) Bike Stations, which provide secure storage as well as additional services at transit stations like showers, maintenance, rentals, and local bicycling advice;
(5) On-street bicycle network improvements to enable the bicycle as a feeder mode
(6) Bicycle sharing programs

This literature and current practice review presents a survey of current bicycle-transit efforts across the world. The review is organized into four strategies, which are gleaned from the six categories outlined above: bicycles-on-transit, bicycle parking, on-street enhancements, and bicycle sharing programs. Appendix A – Model practices for bicycle-transit integration in San Francisco – teases out several exemplary treatments from this review that serve as models for San Francisco.

5.2 Bicycles-on-transit

In the U.S., buses typically have a front-mounted rack with a capacity for 2 bicycles (Schneider, 2005). In some cases, bicycles are allowed inside the vehicle, but often restricted to folding bicycles and/or certain times of day. Bicycle racks on buses are rare in Europe, and instead bicycles are usually allowed on both buses and rail cars (Federal Highway Administration, 2009; Pucher, Dill & Handy, 2010; Martens, 2007; Pucher & Buehler, 2007). In some cases, bicycles are allowed on board even during peak times.

Bicycle on heavy, commuter, and light rail is commonly facilitated by allowing bicycles in particular cars with the requirement that the bicyclist monitor their bicycle throughout the trip; this strategy typically provides space for more bicycles than front-mounted bus racks. In more rare cases, train cars are equipped with special racks or hooks for bicycle storage (e.g. Caltrain[9] and Portland's MAX[10]). As of 2005, several light rail systems across North America were accommodating bicycles on board in some way, including Calgary, Los Angeles, Baltimore, Newark, Denver, San Diego, Vancouver, Portland, Santa Clara, and Minneapolis. Bicycle on ferry, vanpool, and taxi programs are less common.

Due to higher provisions of parking at transit hubs, European cities tend to deemphasize bicycles-on-transit (Pucher & Buehler, 2007). This suggests that with better integration at each end of a transit trip, both bicycle and transit use can increase.

Portland, Oregon was one of the U.S.'s first light rail systems to allow bicycles on board. In a telephone interview, Eric Hesse, Coordinator of Strategic Planning at Portland's TriMet noted that their on-board policy began with a permit-based system. Today, they allow all folding and full-sized bicycles on board both their low- and high-floor LRVs, subject to space availability. They have used on-board supervisors periodically to monitor, among other things, bicyclists' compliance. Perhaps due to the fact that they did not pilot the policy change initially, they found

[9] http://www.caltrain.com/riderinfo/Bicycles/Bicycle_FAQs.html
[10] http://trimet.org/howtoride/bikes/index.htm

it particularly important to leverage the bicycle advocacy community in educating the general public about the policy change and proper etiquette. A safety committee was also created to establish standard operating procedures. Their on-going efforts include managing riders' expectations about available bicycle storage capacity and presenting folding bicycles and bicycle parking as more sustainable long-term solutions to bicycle-transit integration (E. Hesse, personal communication, January 13, 2012).

In the summer of 2011, the SFMTA performed a transit speed and delay study of Market and Mission Street transit vehicles. Among the delay variables are bicycle-related delays. According to the draft report (which used on-board staff to manually record delays), bicycles using the same right of way as transit cause a much smaller delay than cars, taxis, or other transit. The average observed delay caused by bicycles was six seconds; this is the average of 15 recorded instances (out of 7,900 observed delays, or 0.02 percent). These delays primarily affected curb lane transit. Further, bicycles were the cause of 11 percent of recorded "slow down" events, which signify a driver's premature braking or inhibited acceleration to avoid a future delay. Therefore, while bicycles in the roadway are not the primary cause of transit delays, they do account for a large amount of "slow down" delays suggesting a need for policies regarding how transit operators react to bicycles in the roadway.

5.3 Bicycle parking

Bicycle parking near transit stations is provided in several U.S. cities, though generally it pales in comparison to what many international cities provide, and usually is implemented at rail but not bus stations. Bicycle parking at most rail stations in the Netherlands has been provided since the 1970s and as of 2009, there were 350,000 racks at Dutch train stations. All main train stations include guarded parking, bicycle rentals and maintenance facilities (Pucher, Dill & Handy, 2010); smaller stations include bicycle lockers and covered parking (Martens, 2007). Sweden, Denmark, Germany, Switzerland, and the United Kingdom also provide plentiful bicycle parking at transit stations, including racks, covered parking, and secured indoor parking (FHWA, 2009); "copious" amounts are found at downtown stations (Pucher & Beuhler, 2007).

Pucher and Buehler (2009) enumerated the available bicycle parking at transit stations in nine North American cities as of 2008. The most commonly provided facility was bicycle racks; Chicago provided the most (6,420 racks) and New York City the least (0). San Francisco was second with 3,703 racks. In Europe, Latin America, and China, bicycle parking can be found not only at rail stops, but also bus stops and in particular at BRT stations (Pucher, Dill & Handy, 2010; Eckerson, 2008; ITDP, 2010).

After racks, bicycle lockers were the second most common parking facility provided in Pucher and Buehler's analysis of U.S. bicycle parking at transit stations. San Francisco provided the most (2,110), while Chicago, Montréal, and New York City did not provide any.

The last facilities encountered in their analysis were bike stations. These are 24-hour secure bicycle parking often combined with restrooms and showers, repair help, rentals, and information,[11] and are provided on a more limited basis. San Francisco, Chicago, Washington, and Toronto were the only cities that had any bike stations, though more have opened since then, mainly on the West Coast.

Portland, Oregon conducted a survey of its MAX light rail users with bicycles in 2007. The survey results are presented in a report, which recommends promoting and clarifying information on bicycle parking options and making investments in additional parking where available (TriMet, 2008). The survey results also inform recent draft bicycle parking guidelines, which provide many visual examples of Class I, II, and III bicycle parking from around the world (TriMet, 2011).

While not explicitly a bicycle-transit integration strategy, several cities, San Francisco included, now have legislation requiring the provision of bicycle parking in commercial and residential buildings, which facilitate the use of bicycles at both the access (residential) and egress (employment) ends of a trip (Pucher & Buehler, 2011).

5.4 On-street enhancements

On-street bicycle infrastructure is what facilitates bicycle access to and from transit, allows public and private bicycles to replace some transit trips, and can dictate how the two modes interact with one another in the roadway. It is a topic of rising national interest; a Center for Urban Transportation Research study of shared bicycle/bus lanes in the U.S. is underway and expected to be complete in March of 2012 (NCTR, 2011).

But on-street enhancements as a bicycle-transit integration strategy go beyond shared bus lanes. In fact, the Dutch CROW manual (2007) calls for the minimization of shared-use facilities where bicycles and buses travel in the same lane. Alternative strategies range from macro-scale (such as bicycle and transit network coordination) to micro-scale (corridor- or spot-specific treatments).

In a literature review, Michael Schwartz (2009) cites several studies indicating that the decision to bicycle is influenced by the presence and density of bicycle facilities, particularly for those who live close to those facilities. In San Francisco, transit service is so dense that the bicycle network tends to lead bicyclists to transit, even without "explicit coordination" (Pucher & Buehler, 2009). So at a macro level, in San Francisco we might expect those who live closest to existing bicycle facilities to be the population most likely to combine bicycle trips with transit.

Also at the macro scale are plan documents themselves, which set goals and policies for the street network (among other things). San Francisco's 2009 Bicycle Plan made an explicit effort to connect bicycles and transit; the full details of this effort can be found in Existing Conditions above.

[11] http://home.bikestation.com/what-is-bikestation

More micro scale enhancements have also been used. A "green wave" – the timing of green lights to set a particular travel speed for a street – can be used to enhance both bicycle and transit traffic. While this concept originated in Copenhagen and Amsterdam, San Francisco and Portland, Oregon have implemented this solution on select corridors (Sterbentz, 2009; City of Portland Bureau of Transportation, 2010).

There are other unique examples as well: channels or ramps on stairways to facilitate climbing transit station stairs with a bicycle as well as bicycle racks on taxis are found in European cities (FHWA, 2009). In San Francisco, some BART stations are equipped with these stair channels.

Portland has implemented pass-through curb extensions (or "bus bulb plazas") and cycle track routing around transit stops, which can reduce conflicts between frequently-stopped transit vehicles and through-traveling bicyclists – a strategy used more commonly internationally. Several articles exist that deal with this specific type of conflict (Berchem & Somerfeld, 1986; DeRobertis and Rae, 2001; Austroads, 2005; Ireland National Transport Authority, 2006; VicRoads, 2007; Adjei, 2010).

Alta Planning & Design (2008) studied the efforts to reduce transit-bicycle-pedestrian conflicts near stops in the Netherlands, Switzerland, Australia, and Nottingham, England, which include both macro- and micro-scale strategies. These strategies and others were summarized in Table 10 below.

Table 10 - International strategies to reduce transit-bicycle-pedestrian conflict

Location	Strategies	Sources
The Netherlands	Center-running trams with parallel (often physically separated) cycle tracks on the far-right side of the through-way Recommended to route bicycle lanes behind a bus stop, but only where there is space for 2.5 meters between the curb and bus stop plus space behind the stop for the bicycle and pedestrian pathways	Alta Planning & Design (2008) Austroads (2005)
Switzerland	On-street bicycle lanes are common practice, and while center-running trams with center islands are the norm, some areas have implemented curb-side stops with space between the tram and the curb for bicyclists	Alta Planning & Design (2008)
Melbourne, Australia	Center-running trams and center islands are typical, with newly-implemented separated (but at-grade) cycle tracks between the curb and a parking lane on Swanston Street	Alta Planning & Design (2008)

Nottingham, England	Provide bicyclists with alternative routes that do not share corridors with trams; Encourage 90 degree track crossing angles; Directional signage for bicyclists has been an important complement to this strategy	Alta Planning & Design (2008)
Denmark	Bicycle lane between the center island platform and the curb with zebra crosswalks over the bicycle lane at bus stop locations (not recommended in U.S. context; see FHWA (2009))	Austroads (2005)
Lima, Peru Barcelona, Spain Bogotá, Colombia	Several forms of collective public transportation vie for curb space (e.g. buses, jitneys, and taxis). Therefore a median paved bicycle path strategy is used. Wide boulevards with medians are common, so space is available.	DeRobertis & Rae (2001) D. Rodriguez, personal communication, November 2011
Australia	In congested areas with speeds of 40 km/hr and where space is available, a 1.5 meter wide bicycle lane should be provided between the bus lane and traffic lane; In areas where space is unavailable, bicycles should be allowed to share the bus lane, though only recommended in minimal amounts and where the bus does not make stops within the travel lane; When bus speeds are between 40 and 80 km/hr, an extra-wide bus lane is recommended so that bicycles and buses may safely pass one another within the lane. Sydney makes a specific recommendation for all new exclusive transit-ways to include parallel off-road bicycle paths.	Austroads (2005)
Ireland	4 treatments (physical segregation, visual segregation, mixed use of bus lane, and mixed use of street) are guided by 5 criteria (road classification, traffic volumes, bus speed, parking presence, implementation room and costs).	Ireland National Transport Authority (2006)

	For physically- and visually-separated lanes, recommend placing the bicycle lane between the bus shelter and the bus lane, with car parking provided between the bicycle lane and the bus lane where possible. Similar to the Danish guide, for physically-separated facilities, the loading area or island should be placed between the bicycle lane and the bus lane.	

University Avenue in Madison, Wisconsin uses a unique approach. There, a bicycle lane runs to the left of a curbside bus and right-turn only lane, reducing leapfrogging between bicyclists and buses (Berchem & Somerfeld, 1986). In 1993, Nicollet Mall in Minneapolis, Minnesota was made into a 10-block long transit mall that allowed bicycles, but after a bicyclist fatality and much controversy, bicycles were eventually banned from this route and a facility on an adjacent corridor was built (Nottingham's strategy). Hennepin Avenue in Minneapolis includes a contra-flow bus lane on the curb with an adjacent two-way bicycle lane, which has been very successful with no operational issues for bicyclists or transit. Also in Minneapolis, Marquette and 2nd Avenue South (a couplet of one-way streets) each include a contra-flow curbside bus lane adjacent to a one-way bicycle lane, removing leapfrogging and curbside weaving (DeRobertis & Rae, 2001).

Implementing on-street enhancement strategies could improve both access and egress trips as well as bicycle trips along transit corridors by reducing conflict points (Perkins + Will, 2011).

5.5 Bicycle sharing programs

The last of the four major bicycle-transit integration strategies is bicycle sharing. Large U.S. cities such as Washington, D.C.; Minneapolis; Denver; Chicago; and Boston have implemented bicycle sharing programs and New York City and San Francisco plan to implement in 2012. Because of these systems' recentness, no comprehensive studies of U.S. bicycle sharing programs yet exists. Therefore, it is unknown how transit factors have affected bicycle station location decisions in this country, nor how the sharing programs impact transit ridership.

Internationally, however, evidence suggests that these programs increase bicycling as well as transit use (Martens, 2007; Victoria Transport Policy Institute, 2010; D. Rodriguez, personal communication, November 2011). In the Netherlands, Germany, Paris, Lyón, Barcelona, China, São Paolo, Lima, and Buenos Aires, bicycle sharing programs that connect to metro and suburban train and BRT stations have been implemented. Bicing, Barcelona's bicycle sharing system, recorded that by August 2009, 37 percent of bicycle sharing trips had been combined with other modes of travel (Rojas-Rueda, et al, 2011).

Bicycle sharing systems in Beijing, Shanghai, and Hangzhou, China have demonstrated large mode shifts from transit to bicycling (Tang, Pan, & Shen, 2011). This has the advantage of alleviating transit crowding along highly-populated bus lines, which opens up capacity for new transit users. Mode shift data for these cities, along with the European cities of Lyón, Paris, and Barcelona are presented in Table 11 and Table 12, below.

Table 11 – Percent of bicycle sharing trips shifted from other modes (Asian cities)*

Mode	Beijing	Shanghai	Hangzhou
Bus	34.42	40.37	51.45
Metro	14.29	2.75	0
Automobile	--	--	--
Walking	--	--	--

* Tang, Pan, & Shen, 2011

Table 12 - Percent of bicycle sharing trips shifted from other modes (European cities)*

Mode	Lyón	Paris	Barcelona
Bus or subway	50.6	65	51
Car or motorcycle	6.7	8	10
Taxi	--	5	--
Bicycle	3.7	--	--
Walk	36.7	20	26
New trip	2.2	--	--

*Krykewycz et al., 2010

Guangzhou, China provides another example of planned integration. Their system intimately integrates bicycle sharing kiosks with their first BRT corridor. All BRT stations have a bicycle share hub (5,000 bicycles in 113 stations along a 23 kilometer corridor). Guangzhou's is the first BRT system in China to incorporate bicycle share in the station design. The intent of integrating in this way was twofold: both to extend the reach of the BRT system and also to disperse some transit use to bicycle use for nearby residents. Guangzhou has also integrated payment systems across these two modes using the Yang Cheng Tong smartcard, which can also be used to buy commodities (Press, 2011). This system could offer a model for the up-and-coming BRT corridors in San Francisco: Van Ness Avenue and Geary Boulevard.

Shaheen, Guzman, and Zhang (2010) report that so-called "fourth-generation" bicycle sharing programs are the first to attempt seamless integration with transit. The authors offer the example of the Yélo system in La Rochelle, France (launched in 2009) as one of the first to integrate smartcard payment systems between the two modes; this model is also used in the Guangzhou example above.

5.6 Design manuals

Several design manuals exist for bicycle facilities. Only a few deal explicitly with bicycle-transit integration. A summary of this specific guidance is provided as Appendix B – Design guidelines; below, a broad list of design manuals is given.

- NACTO Urban Bikeway Design Guide (NACTO, 2011)
- California Manual on Uniform Traffic Control Devices
- AASHTO Green Book: A Policy on Geometric Design of Highways and Streets
- AASHTO Guide for the Development of Bicycle Facilities[12]
- Federal Manual on Uniform Traffic Control Devices (MUTCD) (FHWA, 2009)
- ADA Accessibility Guidelines for Buildings and Facilities
- Association of Pedestrian and Bicycle Professionals' (APBP) Bicycle Parking Design Guidelines
- Portland Bikeway Facility Design: Survey of Best Practices
- City of San Francisco Bicycle Plan Update: Supplemental Design Guidelines
- Dutch CROW Design Manual for Bicycle Traffic
- London's Cycling Design Standards (TfL, 2005)
- UK Department for Transport's Cycle Infrastructure Design (2008)
- EU Intelligent Energy's PRESTO guide (Promoting Cycling for Everyone as a Daily Transport Mode)
- City of Edinburgh's Tram Design Manual
- German Research Society for Transport's ERA (*Empfehlungen für Radverkehrsanlagen – Recommendations for Cycling Facilities*)
- National Transport Authority of Ireland's National Cycle Manual

5.7 General Research Findings

Most of the academic research on the topic of bicycle-transit integration examines specific treatments in specific locations, and therefore may not be generally applicable to other locations. With local expertise, concepts may be adapted to the context of San Francisco.

Papon et al. (2010) utilized a stated preference survey of Parisians to investigate the preferred types of intermodal facilities at train stations. In that context, respondents were most satisfied with lockers and simple shelters, and most dissatisfied with fees and lack of bicycle paths.

A 2011 study looked at four bicycle-transit integration strategies (bicycle-on-transit, bicycle to transit, shared bicycles, and "two bike") in five U.S. communities – Denver/Boulder, Colorado; Chicago, Illinois; Ithaca, New York; Portland, Oregon; and Santa Clara County, California (Mineta, 2011). The researchers surveyed local bicyclists to determine the preferred strategy for integration. They concluded that the bike-on-transit strategy is preferred, due largely to concerns

[12] Currently in draft form: http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP_15-37_FR.pdf

over unsecured bicycle parking near transit. Therefore, they posited that increasing the security of bicycle parking could improve the competitiveness of the next-best alternative strategy, bicycle-to-transit.

A survey of Shanghai transit riders (Pan, Shen, & Xue, 2010) provided four conclusions about individuals' mode choices for rail station access and egress. A low percentage of rail riders use the bicycle for access and egress, largely due to a lack of bicycle storage and a concern over theft. Rail station access and egress trips are best made by bicycle within the 800 to 2,500 meter range (about 0.5 to 1.5 miles). The choice of whether or not to bicycle to a rail station from a residence is conditioned not only on distance but also on the presence of bus stops and bus service characteristics. Bicycle rental systems appeared to be an effective way to increase bicycle use among transit riders.

In a literature review of the Dutch experience, Martens (2007) found that the use of the bicycle to access transit or to travel to a destination after a transit trip offers the potential to close the "travel time gap" between car and transit. Additionally, railway stations were characterized by larger catchment areas than slower modes of transit, suggesting that BRT systems could draw riders from a larger area than traditional bus service – again, with implications for the future Van Ness and Geary BRT corridors in San Francisco.

Two very recent studies of public bicycle transportation system design (i.e. where to locate bicycle sharing stations) noted that no other articles have yet been published that address the strategic planning of the location of bicycle sharing hubs (Lin & Yang, 2011; Lin, Yang & Chang, 2011). Therefore, to date there seems to be no accepted best practice for systematically placing bicycle hubs near public transit.

That being said, it appears most users of bicycle sharing systems come from would-be transit riders, suggesting that a good strategy would be to locate hubs near large transit stations or major transfer points. A 2010 study performed a GIS analysis to identify the set of Philadelphia's traffic analysis zones (TAZs) that were the most "fruitful" locations for bicycle sharing hubs (Krykewycz, et al., 2010). One input used in their model was the percent of bicycle sharing trips diverted from other modes. As of the time of the study, no North American bicycle sharing systems yet had this data, so data from three European cities were relied upon: Lyon and Paris, France and Barcelona, Spain. In each of these cities, bus and subway were the predominant modes from which bicycle share users came (see Table 11 and Table 12).

In a study of Minneapolis' bicycle sharing system, Maurer (2011) found that a greater distance to rail stations was associated with more bicycle share rentals, and that transit intensity was increased with fewer rentals. This could mean that for cities well-served by transit, bicycle sharing and transit are competing modes, while cities or areas that are less transit-dense might be complemented by bicycle sharing. It was cautioned that the local context will determine the factors that affect how bicycle sharing programs are utilized. The study also revealed that bicycle

sharing system planners should consider transportation network variables, like proximity to transit and bicycle facilities, when deciding station placement.

Points worth highlighting, therefore, include:

- People are concerned with the security of bicycle parking options near transit
- People who bicycle to transit generally come from a distance that is slightly farther than one would walk (0.5 – 1.5 miles)
- Bicycle rental systems have the potential to increase bicycling among transit riders, though full-scale bicycle sharing programs are expensive up-front investments
- BRT and rail systems draw customers from larger radii than buses, so bicycles could be an important access mode for these systems

6. Recommendations

As noted previously, there exist several existing-but-unimplemented policy and infrastructure recommendations for San Francisco. Because these recommendations were highlighted in Existing Conditions, they are not repeated here. This section was reserved for new proposals – Section 6.1 deals with infrastructure recommendations for Polk Street while Section 1.1 addresses citywide policy and programmatic changes.

Additionally, within these two sections, the suggested improvements were split into two categories: Ideal and Critical. The "Ideal Recommendations" represent a best-case, unconstrained scenario, whereby any imaginable changes to the Polk Street right-of-way would be feasible. Recognizing that real constraints do exist, a subset of the Ideal Recommendations was presented as "Critical Recommendations;" still ambitious yet constrained, these proposals promote investments that are *critical* to the achievement of this and other studies' goals.

Both sets of recommendations were made with the future in mind; they attempt to leverage the expected new demand for bicycling and transit induced by new and upcoming projects such as BRT, smart parking, bicycle sharing, and congestion pricing. Specifically, the city's broad mode share and study-specific goals of bicyclist and pedestrian safety, transit reliability, and transit crowding relief guided these recommendations.

Recommendations were formulated by starting with the needs identified above and then filtering those through the four main strategies identified in literature review: bicycles-on-transit, bicycle parking, on-street enhancements, and bicycle sharing. Table 13 lists these strategies and highlights how each is appropriate for a different use case. Recommendations for specific infrastructure improvements were directed by the design guidelines documents referenced in the literature review.

Table 13 - Four main bicycle-transit integration strategies and use case

Strategies	Bicycle-Transit Integration Use Case*
Bicycles-on-transit	*Complementary*
Bicycle parking	*Complementary* when near transit
On-street enhancements	Generally *substituting* *Complementary* when enables bicycle share and personal bicycling to and from transit
Bicycle sharing	*Complementary* when extending catchment area *Substituting* when good on-street infrastructure and shorter trips
*By *complementary* it is meant that this strategy facilitates trips which combine both bicycling and transit; *substituting* means this strategy increases the likelihood that an entire trip will be taken either by transit or by bicycle – not necessarily that a trip on one mode replaces a trip on the other mode, though this could be the case	

6.1 Polk Street: Infrastructure and design recommendations

Polk Street is the main north-south bicycle route in this area of the city and is supported by a major transit and automobile throughway located one block to its west (Van Ness Avenue). Given its position in the transit and bicycle network hierarchies, Polk Street bicycle traffic would most appropriately be classified as *substituting* for transit; these are trips that could either be taken on transit *or* by bicycle, and most commonly would *not* combine the two modes. Therefore, on-street enhancements for improved bus-bicycle interaction in the right-of-way, bicycle sharing, and to a limited extent bicycle parking are the most appropriate strategies for integration here (see Table 13). Strategies for Van Ness Avenue may be thought of as *complementary* – where the combination of bicycle and transit trips is facilitated and encouraged; Polk Street strategies may be viewed as *substituting* – where the focus is on safely coexisting.

The schematic at the end of section 6.1 provides a visual depiction of some of the Ideal Recommendations. These (and Critical recommendations) for the Polk Street corridor are listed in detail in the tables below. Section 1.1 details city- and system-wide recommended improvements in the areas of engineering, enforcement, education, encouragement, and evaluation.

6.1.1 Corridor and neighborhood

The following table presents corridor- and neighborhood-scale recommendations for Polk Street. Where the two differ, separate Ideal and Critical recommendations were delineated. The list was ordered by the timeline for implementation (short-, medium-, or long-term).

Table 14 - Corridor and neighborhood recommendations

Location(s)	Recommendation	Reasoning	Timeline*
Polk between Beach and Lombard	*Ideal:* East side – remove on-street parking, add 6' colored bicycle lane *Critical:* East side - add sharrows	Increase perceived and actual safety for bicyclists; increase prominence of bicycle mode	*Ideal:* MT-LT *Critical:* ST
Polk between Broadway and Jackson	Increase on-street bicycle parking	Increase bicycle accessibility to Polk Street retail, supplement transit access	ST
Polk between Post and O'Farrell	Increase on-street bicycle parking	Increase bicycle accessibility to Polk Street retail, supplement transit access	ST
Polk between Eddy and Turk	Increase on-street bicycle parking	Increase bicycle accessibility to Polk Street retail, supplement transit access	ST
Eddy between Polk and Van	Install sharrows in both directions	To guide bicyclists between Polk bicycle route and Van	ST

Ness		Ness BRT station	
Polk between McAllister and Grove	Install northbound bicycle lane (colored green), angled back-in parking	Increase bicycle and pedestrian safety and visual prominence / connectivity of bicycle on corridor	ST-MT
Sacramento between Polk and Van Ness	*Ideal:* Remove south-side on-street parking, install two-way separated cycle track, facilitate bicycle access to BRT station *Critical:* Install sharrows westbound, facilitate bicycle access to BRT station	To guide bicyclists between Polk bicycle route and Van Ness BRT station	*Ideal:* MT-LT *Critical:* ST
Green at Van Ness	Facilitate bicycle access to future BRT station	Improve bicycle connection between Polk and future Van Ness BRT station	MT
Pacific between Polk and Van Ness	Shift bicycle network from Broadway to Pacific; facilitate bicycle access to/from BRT station @ Jackson	Improve bicycle connection between Polk and future Van Ness BRT station	MT
Sutter between Polk and Van Ness	*Ideal:* remove south-side on-street parking, install two-way separated cycle track *Critical:* Install sharrows westbound	Improve bicycle connection between Polk and future Van Ness BRT station	*Ideal:* MT-LT *Critical:* ST
Post between Polk and Van Ness	*Ideal:* Remove south-side parking, install "bus bulb plaza" at Van Ness, install 2-way protected curb-side bicycle lane on south side *Critical:* Clear with State of California law – a pilot of sharrows in the transit-only lane; install sharrows south side	Improve bicycle connection between Polk and future Van Ness BRT station; parking garage located on same block	*Ideal:* MT-LT *Critical:* ST-MT
Polk between Filbert and Market	Pedestrian-scale lighting	Inviting retail environment, increase perceived and actual safety	MT
Polk between Filbert and Geary	*Ideal:* Separated cycle tracks (green coloration) both sides; eliminate west side parking (see Figure 1); loading zones near intersections where cycle	Increase perceived and actual safety for bicyclists; increase visual prominence and connectivity of bicycle on corridor; remove conflict	*Ideal:* MT-LT

	track is routed into traffic lane; increased way finding signage for parking garages *Critical:* Remove sharrows and continue bicycle lane both sides	points with 19-Polk; allow loading	 *Critical:* ST
Polk between Geary and Ellis	West side as is (add green coloration); east side switch parking and bicycle lane (particularly on block between Ellis and O'Farrell)	Increase perceived and actual safety for bicyclists, especially on uphill section; increase prominence of bicycle	MT
Polk between Filbert and O'Farrell	Pedestrian-scale lighting	Increase safety and attractiveness of corridor	MT
*ST = short-term (0-1 years); MT = medium-term (1-3 years); LT = long-term (3-5 years)			

6.1.2 Point and station

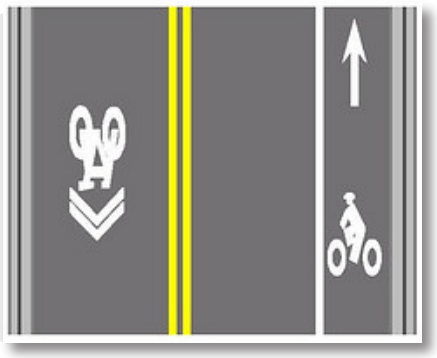
Table 15 - Point and station recommendations

Location(s)	Recommendation	Reasoning	Timeline*
Polk at Pine	Improve intersection lighting	Safety measure – many collisions in darkness	ST
Polk at Post	Improve intersection lighting Add bus shelter northbound and southbound stops	Safety measure – many collisions in darkness Improve transit visibility and prominence on corridor	ST-MT
Polk at Green Polk at Broadway Polk at Sacramento Polk at Sutter Polk at Eddy Polk at McAllister Polk at Market	Way finding signage to BRT station – at bicyclists' eye level and large print	Guide bicyclists to future BRT stations, especially bicycle sharing patrons	ST-MT
Polk at Francisco Polk at Filbert	*Ideal:* Signalization of intersection or roundabout (and gateway treatment at Filbert) *Critical:* Continental crosswalks at Filbert	Collision history at corridor's only two non-signalized intersections	MT-LT
Polk at Green, southeast corner	*Ideal:* Add covered bicycle parking with maintenance kiosk; double as bus shelter	Increase bicycle accessibility to northern end of commercial segment, enhance connection	*Ideal:* MT

	and protected parking *Critical:* Additional on-street bicycle parking	to future BRT	 *Critical:* ST
Pacific at Polk, northeast corner Mid-block between Jackson and Washington	Opportunity for bicycle sharing station; (include bus shelter on mid-block location)	Space available on existing bus bulb-out or next to shelter; connections to 19-Polk and BRT	MT
Polk at Washington	Add northbound bus shelter	Improve transit visibility and prominence on corridor	MT
Polk at California, northeast corner	Opportunity for bicycle sharing station	Bicycle connection to 19-Polk, BRT, California cable car	MT
Polk at Sutter	Opportunity for bicycle sharing station (within metered spaces)	Bicycle connection to 19-Polk, other Muni and GG Transit routes	MT
Polk at McAllister, northwest corner	*Ideal:* Add westbound bus bulb plaza and add continental crosswalks across intersection *Critical:* Continental crosswalks	Improve safety for alighting passengers; reduce delays for westbound bus	*Ideal:* MT *Critical:* ST
Polk at McAllister, southeast corner	Add bulb-out on corner creating space for a bicycle sharing station	Increase bicycle connectivity with corridor and Van Ness; increase safety at high-collision intersection by narrowing roadway	MT
Polk at Market	Potential bicycle sharing station	High traffic area, connections with Market Street and Polk bicycle routes and Van Ness transit corridor	MT
Polk at McAllister Polk at Grove Polk at Market	Construct or provide incentives for a visible and prominent bicycle station located near one of these prominent civic locations	Near future BRT and Market Street transit lines; provides secure bicycle parking for those who commute by bicycle or combine their bicycle commute with transit	MT-LT
*ST = short-term; MT = medium-term; LT = long-term			

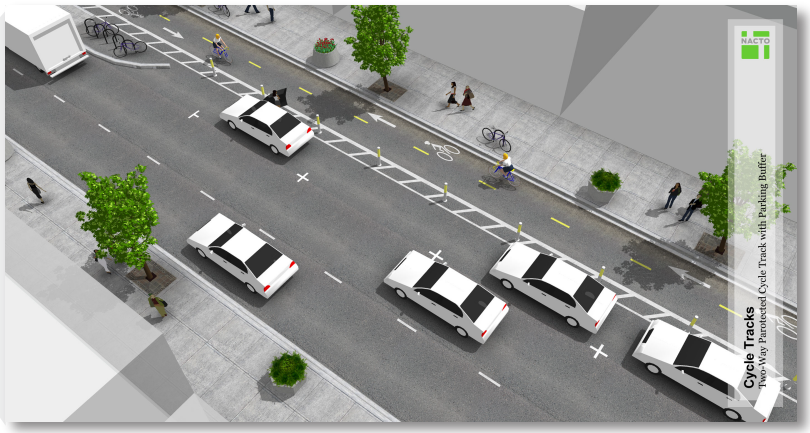
The illustration below was created to depict exemplary Ideal Recommendations made for Polk Street and its connections to Van Ness Avenue.

Example Recommended Treatments



Beach to Lombard: Add sharrows in downhill direction (Masoner, 2011)

Filbert to Geary: Create protected cycle track, both sides (WoodsBagot, 2012)



Sutter between Van Ness and Polk: 2-way protected cycle track, consider extending (NACTO, 2011)

Polk between Grove and McAllister: Improved bicycle facility and back-in angled parking (Sundstrom, 2009)

● Opportunities for bicycle sharing stations

6.2 Citywide

6.2.1 Engineering

Table 16 - Citywide engineering recommendations

Recommendation	Reasoning
Consideration of BRT stations as major determinant of bicycle sharing station location	Increase complementary nature of bicycles and transit; provide BRT passengers, who tend to access transit from further away than traditional bus service, an alternative access/egress mode
Work with state to pilot sharrows in transit-only lanes, study delay effects	Determine if state law prohibiting bicycle use of transit-only lanes has positive or negative effects

6.2.2 Education

Table 17 - Citywide education recommendations

Recommendation	Reasoning
Standardize bus operator policy on bus-bicycle interactions and conduct an operator safety workshop with operators of private fleets	See Table 18 for suggested policy. Meant to improve bicyclists' perception of safety without compromising transit reliability.
Clarification of bicycle on light rail policies information on SFMTA website.	Currently shows availability of bus lines with bike racks, but is not explicit about lack of availability on light rail.

6.2.3 Enforcement

Table 18 - Citywide enforcement recommendations

Recommendation	Reasoning
Bus operator training and safety workshop Suggested policies regarding bus-bicycle interaction: • Allow bicyclists to fully pass buses and regain curbside position before a bus leaves or accelerates out of a stop • Allow bicyclists to pass a bus stop before the bus pulls into it	These policies leverage the Better Market Street Speed and Delay study finding that bicycles account for a large portion of "slow down" delays, but that overall bicycles in the roadway represent only 0.02 percent of transit delay. The training will integrate these findings into practice, increasing bicyclists' perception of safety on the road without adding additional significant transit delay.
Passage of the Bicycle Access and Safety Ordinance This should be passed and marketed heavily to current transit users specifically whose trip lengths are compatible with bicycling	Enhance the bicycle as a commute option; enable current transit users to combine bicycle and transit trips, substitute some trips

6.2.4 Encouragement

Table 19 - Citywide encouragement recommendations

Recommendation	Reasoning
Implement multi-modal smartcard fare cards	Increase ease of integrating a transit and bicycle share trip; increase ease of using transit and improve on-time performance through faster boarding
Promotion on buses (advertisements) of bicycle share and general bicycle use	Promote the option of switching transit trips to bicycle trips and combining trips; increase visibility of bicycles
Pilot program for bicycles on LRVs	Increase the reach of the light rail system; provide comfort to current and would-be bicyclists who can only bicycle one-way or who encounter other unexpected barriers to bicycling
Partner with San Francisco's Chief Innovation Officer to create a smartphone application that enables mobile payment for bicycle share and transit services and transmits real-time transit and bicycle availability information. The application could also track trips using GPS.	By making using transit and bicycle sharing easier, alternative transportation can be encouraged. Additionally, the application could provide valuable service planning data to the SFMTA.

6.2.5 Evaluation

Table 20 - Citywide evaluation recommendations

Recommendation	Reasoning
Enhance tracking of non-infrastructure bicycle plan action items (including recommendations on bicycle-transit integration) by SFMTA	Many non-infrastructure action items were called for within the 2009 bicycle plan. Due to the litigation that ensued over the plan's environmental review, much of the monitoring of the plan's implementation has been focused on infrastructure items only. This procedural structure could cause the bicycle-transit integration action items (most of them non-infrastructure based) to be delayed or ignored.
Incorporate bicycle-transit integration into current Bicycle Strategy planning process. Prioritize upgraded facilities investments to those corridors that enhance bicycle accessibility to transit or provide an alternative route to transit	This is a strategy to increase the likelihood of bicycle-transit integration implementation.

7. Funding Opportunities

The following table lists grant funding opportunities for the implementation of the recommendations above.

Table 21 – Funding opportunities

Granter	Grant Name	Grant Cap	Eligibility	Deadlines
Metropolitan Transportation Commission	Safe Routes to Transit	$750,000 for capital $200,000 for planning	Planning, Capital	Call for projects: June Application deadline: August
Caltrans	Community-based Transportation Planning	$300,000	Planning, Design, Education	Application deadline: April
Caltrans	California Safe Routes to School	$450,000	Design, Construction, Education	Application deadline: March
Caltrans	Federal Safe Routes to School	$1,000,000 (infrastructure) $500,000 (non-infrastructure)	Design, Construction, Education	Pending Federal transportation bill reauthorization
Metropolitan Transportation Commission	Transportation Development Act Article 3	Approx. $1,000,000 available for SF county total	Planning, Design, Construction, Education	
Caltrans	Transportation Enhancements	Approx. $75,000,000 available statewide	Planning, Design, Construction, Education	Pending Federal transportation bill reauthorization
Caltrans	Bicycle Transportation Account	Typically $7.2 million statewide available	Planning, Design, Construction, Capital	Application deadline: April

8. References

Adjei, E. (2010). *Multimodal Urban Transport: Integrating Non-Motorized and Bus Transport* (Master's Thesis). Retrieved from http://www.itc.nl/library/papers_2010/msc/upm/adjei.pdf.

Alta Planning & Design. (2008, October). *Bicycle Interactions and Streetcars: Lessons Learned and Recommendations.* Retrieved from http://www.altaplanning.com/App_Content/files/pres_stud_docs/Bicycle_Streetcar_Memo.pdf .

Alta Planning & Design. (2009, February). *Cycle Tracks: Lessons Learned*. Retrieved from http://www.altaplanning.com/App_Content/files/pres_stud_docs/Cycle%20Track%20lessons%20learned.pdf.

Bachand-Marleau, J., Larsen, J., & El-Geneidy, A.M. (2010). The much anticipated marriage of cycling and transit: But how will it work? *Transportation Research Record.*

Berchem, S. & Somerfeld, W.O. (1986). Unique Roadway Design Reduces Bus-Bike Conflicts. *ITE Journal, 56*(2), 46-47.

California Department of Motor Vehicles. (2011). VC Section 670 Vehicle. Retrieved from http://www.dmv.ca.gov/pubs/vctop/d01/vc670.htm.

Chicago Department of Transportation & Chicago Transit Authority. (2010, July 31). *Share the road – Buses and bicycles.* Retrieved January 12, 2012, from http://www.youtube.com/watch?v=SqmBgjS5klo.

City of Edinburgh. (2006). *Edinburgh Tram Design Manual*.

City of Portland Bureau of Transportation (PBOT). (2010). *Portland Bicycle Plan for 2030: Appendix D: Bikeway Facility Design: Survey of Best Practices.* Retrieved from http://www.bv.com.au/file/portland%20bikeway%20design%20best%20practices(2).pdf.

City of San Francisco. (2012). *San Francisco Planning Code, Article 1.5: Off-street parking and loading, Sections 155.1 to 155.5.* Retrieved from http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:sanfranciscо_ca.

DeRobertis, M. M. & Rae, R. (2001). Buses and Bicycles: Design Alternatives for Sharing the Road. *ITE Journal, (71)*5, 36-44.

Eckerson, Jr., Clarence. (2008). Bus rapid transit: Bogotá [Motion Picture]. United States: Streetfilms. Retrieved from http://www.streetfilms.org/bus-rapid-transit-bogota/.

Federal Highway Administration (FHA). (2009). *International Scan Summary Report on Pedestrian Safety and Mobility.* Retrieved from: http://www.fhwa.dot.gov/ENVIRONMENT/BIKEPED/pbssummary062409.pdf.

Federal Highway Administration (FHWA). (2009). Manual on Uniform Traffic Control Devices: 2009 Edition. Retrieved from http://mutcd.fhwa.dot.gov/pdfs/2009/pdf_index.htm.

Freemark, Yonah. (2010, October 13). *Transit mode share trends looking steady; rail appears to encourage non-automobile commutes.* The Transport Politic. Retrieved from http://www.thetransportpolitic.com/2010/10/13/transit-mode-share-trends-looking-steady-rail-appears-to-encourage-non-automobile-commutes/.

Harden, B. (2008, August 31). *For Bicyclists, a widening patchwork world*. The Washington Post. Retrieved from http://www.washingtonpost.com/wp-dyn/content/article/2008/08/30/AR2008083000632.html.

Hegger, R. (2007). Public Transport and Cycling: Living Apart or Together. *Public Transport International, (56)*2, 38-41. Retrieved from http://www.uitp.org/public-transport/urban/pics/ptcycling.pdf.

Institute for Transportation and Development Policy (ITDP). (2010). Guangzhou BRT. Retrieved from http://www.itdp.org/our-work/where-we-work/guangzhou/.

Ireland National Transport Authority. (2006). *Provision of Cycling Facilities – National Manual for Urban Areas Chapter 5: Buses & Cycling*. Retrieved from http://www.nationaltransport.ie/downloads/archive/provision_of_cycling_facilities_ch5_2006.pdf.

Krizek, K.J. & Stonebraker, E.W. (2010). *Assessing Options to Enhance Bicycle and Transit Integration*. Transportation Research Board Annual Meeting 2011 Paper #11-3959.

Krizek, K.J. & Stonebraker, E.W. (2010). Bicycling and Transit: A Marriage Unrealized. *Transportation Research Record, 2144*, 161-167.

Krykewycz, G.R., Puchalsky, C.M., Rocks, J., Bonnette, B., & Jaskiewicz, F. (2010). Defining a primary market and estimating demand for major bicycle-sharing program in Philadelphia, Pennsylvania. *Transportation Research Record, 2143*, 117-124.

Lin, J.R. & Yang, T.H. (2011). Strategic design of public bicycle sharing systems with service level constraints. *Transportation Research Part E, 47*, 284-294.

Lin, J.R., Yang, T.H, & Chang, Y.C. (2011). A hub location inventory model for bicycle sharing system design: Formulation and solution. *Computers & Industrial Engineering* (in press).

Martens, K. (2004). The bicycle as a feedering mode: experiences from three European countries. *Transportation Research Part D, 9*(4), 281-294.

Martens, K. (2007). Promoting bike-and-ride: The Dutch Experience. *Transportation Research Part A, 41*(4), 326-338.

Masoner, Richard. (2011). *AASHTO sharrow,* [online image]. Retrieved March 15, 2012, from http://www.flickr.com/photos/bike/5513344578/.

Maurer, L.K. (2011). Feasibility Study for a Bicycle Sharing Program in Sacramento, California (accepted). *Transportation Research Record*.

Metropolitan Transportation Commission (MTC). (2011). Funding – RM2. Retrieved from http://www.mtc.ca.gov/funding/RM2/.

Mineta Transportation Institute. (2011). *Bicycling access and egress to transit: Informing the possibilities.* San Jose, CA: Krizek, K.J., Stonebraker, E., & Tribbey, S.

National Association of City Transportation Officials (NACTO). (2011). NACTO Urban Bikeway Design Guide. Retrieved from http://nacto.org/cities-for-cycling/design-guide/.

National Center for Transportation Research (NCTR). (2011). A Guide to Design, Policies, and Operational Characteristics for Shared Bicycle/Bus Lanes (research in progress). Retrieved from http://www.nctr.usf.edu/2011/02/a-guide-to-design-policies-and-operational-characteristics-for-shared-bicyclebus-lanes/.

New York City Department of Transportation (NYCDOT). (2012). NYC DOT – Bikes in buildings. Retrieved from http://www.nyc.gov/html/dot/html/bicyclists/bikesinbuildings.shtml.

Pan, H., Shen, Q., & Xue, S. (2005). Intermodal transfer between bicycles and rail transit in Shanghai, China. *Transportation Research Record, 2144*, 181-188.

Papon, F., Assaf, P., Berezoski, K.C., Osipov, C., Davila, E.S.M. (2010). *Intermodal Bicycle Parking Facilities: A Stated Preference Survey*. Transportation Research Board Annual Meeting 2011 Paper # 11-0343.

Perkins + Will Consultant Team (Perkins + Will). (2011). *Better Market Street Briefing Book Part Two: Best Practices.* Retrieved from San Francisco Municipal Transportation Agency.

Ploeger, J. & Centrum voor Regelgeving en Onderzoek in de Grond-, Water-, en Wegenbouw en de Verkeerstechniek (CROW). (2007). *CROW Design Manual for Bicycle Traffic.* The Netherlands: National Information and Technology Platform for Infrastructure, Traffic, and Public Space.

Press, E. (2011). Guangzhou Connects Bus Rapid Transit with Bike Share. *Policy Innovations.* Retrieved from http://www.policyinnovations.org/ideas/video/data/000371.

Pucher, J. & Buehler, R. (2007). Cycling for Everyone: Lessons from Europe. *Transportation Research Record, 2074*, 58-65. Retrieved from http://policy.rutgers.edu/faculty/pucher/Cycling%20for%20Everyone%20TRB.pdf.

Pucher, J. & Buehler, R. (2009). Integrating Bicycling and Public Transport in North America. *Journal of Public Transportation, 12*(3), 79-104.

Pucher, J. & Buehler, R. (2011, March). *Analysis of Bicycling Trends and Policies in Large North American Cities: Lessons for New York.* Retrieved from http://www.utrc2.org/research/assets/176/Analysis-Bike-Final1.pdf.

Pucher, J., Dill, J. & Handy, S. (2010). Infrastructure, programs, and policies to increase bicycling: An international Review. *Preventive Medicine, 50*(1), S106-S125.

Rietveld, P. (2000). The accessibility of railway stations: the role of the bicycle in The Netherlands. *Transportation Research Part D, 5*, 71-75.

Rojas-Rueda, D., de Nazelle, A., Tainio, M., & Nieuwenhuijsen, M.J. (2011). The health risks and benefits of cycling in urban environments compared with car use: health impact assessment study. *BMJ, 343.* Retrieved from http://www.bmj.com/content/343/bmj.d4521?tab=full.

San Francisco Bicycle Coalition (SFBC). (2012, March 13). Board of Supervisors approved groundbreaking bicycle access legislation [Press Release]. Retrieved from: http://www.sfbike.org/download/newsreleases/2012-03-13_BicycleAccessBillApproved.pdf.

SFBC. (2012). Polk Street: Connecting the city from City Hall to Aquatic Park. Retrieved from http://www.sfbike.org/?polk.

San Francisco County Transportation Authority (SFCTA). (2011). *Van Ness Avenue Bus Rapid Transit (BRT) Fact Sheet.* Retrieved from http://www.sfcta.org/content/view/306/152/.

San Francisco Municipal Transportation Agency (SFMTA). (2009). *2009 San Francisco Bicycle Plan*. Retrieved from http://www.sfmta.com/cms/bproj/documents/San_Francisco_Bicycle_Plan_June_26_2009_002.pdf.

SFMTA. (2011). *Climate Action Strategy.* Retrieved from http://www.sfmta.com/cms/rcap/capindx.htm.

SFMTA. (2011a). Masonic Avenue street redesign study. Retrieved from http://www.sf-planning.org/ftp/CDG/docs/masonic/Masonic_Avenue_Street_Redesign_Study.pdf.

SFMTA. (2011b). Bikes on Muni. Retrieved from http://www.sfmta.com/cms/bcomm/BikesonMuni.htm.

SFMTA. (2011c). San Francisco Transportation Fact Sheet: November 2011. Retrieved from http://www.sfmta.com/cms/rfact/documents/SFFactSheet201111-29-2011.pdf.

SFMTA. (2011d, December 6). Transit effectiveness project: EIR public scoping (PowerPoint presentation). San Francisco, CA.

SFMTA. (2012, February 8). Bike routes, garages, & lockers. Retrieved from http://www.sfmta.com/cms/uploadedfiles/dpt/bike/Bike_Parking/bike_map.pdf.

San Francisco Planning Department (SF Planning). (2009, June). Transit corridors. Retrieved from http://www.sf-planning.org/index.aspx?page=2426.

Schneider, R. (2005). *Integration of Bicycles and Transit - A Synthesis of Transit Practice. TCRP Synthesis 62*. Retrieved from http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_62.pdf.

Schwartz, M. (2009). *Environmental Determinants of Bicycling to Rail Stations in Chicago* (Master's Thesis). Retrieved from UNC Master's Paper Collection database: http://dc.lib.unc.edu/s_papers/?CISoroot=/s_papers.

Shaheen, S., Guzman, S., & Zhang, H. (2010). Bikesharing in Europe, the Americas, and Asia: Past, Present, and Future. *Transportation Research Record, 2143*, 159-167.

Sladek, M. (2009). NYC bicycle advocate Transportation Alternatives wins $10,000 grant. *Examiner.com.* Retrieved from http://appapi.examiner.com/bicycle-transportation-in-new-york/nyc-bicycle-advocate-transportation-alternatives-wins-10-000-grant.

Sterbentz, J. (2009). Valencia Signals Re-timed to Improve Traffic Flow and Safety. *San Francisco Streetsblog.* Retrieved from http://sf.streetsblog.org/2009/03/02/valencia-signals-re-timed-to-improve-traffic-flow-and-safety/.

Sundstrom, Carl. (2009). *No title*, [online image]. Retrieved March 15, 2012, from http://www.pedbikeimages.org/pubdetail.cfm?picid=590.

Tang, Y., Pan, H., Shen, Q. (2011). *Bike-Sharing Systems in Beijing, Shanghai and Hangzhou and Their Impact on Travel Behavior*. Transportation Research Board Annual Meeting 2011 Paper # 11-3862.

Transport for London (TfL). (2005). *London Cycling Design Standards*. Retrieved from http://www.tfl.gov.uk/businessandpartners/publications/2766.aspx.

TriMet. (2008). Bike-MAX survey. Retrieved from Eric Hesse, TriMet staff, January 16, 2012.

TriMet. (2011). Bicycle parking guidelines (draft). Retrieved from Eric Hesse, TriMet staff, January 16, 2012.

TriMet. (2012). How to load your bike on MAX. Retrieved from http://trimet.org/howtoride/bikes/bikesonmax.htm.

UK Department for Transport. (2008). *Cycle Infrastructure Design*. Retrieved from http://www2.dft.gov.uk/pgr/roads/tpm/ltnotes/ltn208.pdf.

VicRoads. (2007). *Cycle Notes 19: Providing for Cyclists within Bus Lanes.* Retrieved from http://www.vicroads.vic.gov.au/Home/Moreinfoandservices/Bicycles/StrategicDirectionsForCycling/BicycleFacilityDesignStandards.htm.

Victoria Transport Policy Institute (VTPI). (2010). *TDM Encyclopedia: Bike/Transit Integration*. Retrieved from http://www.vtpi.org/tdm/tdm2.htm.

WoodsBagot. (2012). *Polk Street bikeway*, [online image]. Retrieved March 15, 2012, from http://www.connectingthecity.org/routes/north-south/.

9. Appendix A – Model practices for bicycle-transit integration in San Francisco

9.1 Bicycles-on-transit

One model for San Francisco is Portland, Oregon's MAX light rail system, whose policies are similar to many international cities'. Portland's MAX LRVs allow all bicycles on board when space allows (TriMet, 2012). Their high- and low-floor LRVs have been retrofitted for bicycle storage with designated spots and storage hooks. Their bikes-on-board policy states that if your bicycle will not fit within the designated area or your bicycle blocks the aisle or door, you must exit and wait for another train.

Additional cities to reference when designing a bicycle-on-light rail policy include Minneapolis,[13] San Diego,[14] and Seattle.[15]

Best practices

- Provide front-mounted bicycle racks on all buses, minimum capacity of two
- Inside the vehicle, bicycles should be stored on hooks or other designated areas when available
- Bicycles may be stored in priority seating areas only if no senior citizens or riders with disabilities need to use the area
- If there is no room in designated or priority seating areas or the bicycle would block the doorway and/or aisle, the bicyclist must wait for the next train
- Bicycles must always be walked within the transit station
- Be prepared to use on-board supervisors for periodic enforcement of bicycle policy; operator should always be focused on safe operations in front
- Educate operators, supervisors, and station attendants on agency policy
- Leverage bicycle advocacy groups to promote proper bicycle-on-board etiquette
- Establish a safety committee to monitor and evaluate operations of bicycles on light rail
- Support bicycle-on-board policy while managing bicyclists' expectations about available capacity

9.2 Bicycle parking

The secured bicycle parking at BRT stations in cities like Bogotá and Guangzhou provides an example for San Francisco's Van Ness and Geary corridors, where BRT is planned. The European practice of providing large scale bicycle parking in downtowns (especially near transit hubs) as well as covered parking at smaller transit stations exemplify another general practice that could be applicable to some of San Francisco's transit corridors. Showers and lockers are

[13] http://metrotransit.org/bike-n-ride-on-hiawatha-light-rail.aspx
[14] http://www.sdmts.com/Bikes_onboard.asp
[15] http://www.soundtransit.org/Rider-Guide/Bringing-your-bike.xml

additional amenities that have been provided on a more limited scale, but are recommended when feasible.

Best practices

- High-capacity bicycle parking in downtowns, especially near transit
- Secured and/or covered bicycle parking at BRT and rail stations
- Bicycle maintenance facilities at major transit hubs
- Keep bicycle racks out of the pedestrian way
- Promote all bicycle parking options

9.3 On-street enhancements

Best practices

- Bicycle facilities should only share sidewalk space on uphill sections where bicycle speeds will be low
- Bicycle facilities can be placed behind a bus stop, but this is only recommended where there is at least 5 to 10 feet from the front of the bus shelter to the edge of the loading platform and ample space behind the loading platform for both the bicycle and pedestrian right-of-way
    - The bus stop can be placed on a loading island, grade separating the pedestrian and bicycle facilities
- Avoid bicycle facilities that pass between alighting passengers and the loading platform
- Minimize shared bus-bicycle lanes
    - In areas with congestion and low to medium bus speeds, place the bicycle facility to the left of the transit-only lane
    - In areas of high bus speed, allow the lane to be shared with bicycles only when the lane is wide enough to facilitate passing a bicyclist
    - If no space is available for passing, allow shared use only when the bus stops outside of the right-of-way
- Provide way finding signage along bicycle routes running parallel to transit, directing bicyclists to stops and stations
- Bicycle improvements should not create negative impacts on transit operations
- Bicycle network should provide access to all major transit hubs (e.g. Muni Metro, Caltrain, and BART in San Francisco)
- “Green waves,” timed green light phases, facilitate smooth flow of bicycles and transit on shared corridors
- Contra-flow transit lanes provide an opportunity for a center-running contra-flow bicycle facility
- Educate bus operators on how to interact with bicyclists on the roadway (see Chicago Department of Transportation and Chicago Transit Authority, 2010)

9.4 Bicycle sharing programs

Best practices regarding bicycle sharing programs' integration with public transit systems have yet to be identified based on the experience of recently-implemented North American bicycle sharing systems. In other locations, including those in Europe and Asia, "fourth-generation" bicycle sharing systems offer state-of-the-art integrated payment systems for shared bicycles and transit.

Best practices

- Consider transportation network variables (proximity to transit, bicycle networks) when locating hubs
- Locate bicycle sharing hubs in or near large transit stations, especially BRT and rail
- Track mode shift from other modes to bicycle sharing
- Make explicit and principled station location decisions

Unique practices

- Bicycle sharing hubs at all BRT stations (Guangzhou, China)
- Integrated payment systems for transit and shared bicycles (La Rochelle, France; Guangzhou, China)
- Transit driver training videos (Chicago; Washington, DC)
- Market bicycle-transit connections; individualized marketing (Portland, Oregon TravelSmart program)
- Allow bicycle access to commercial buildings (New York City)
- Promotion of folding bicycles for use in combination with transit (Portland, Oregon)
- Install censors in bus-mounted bicycle racks in order to correlate bus dwell time with bicycle loading and unloading; could allow bicyclist on board to monitor bicycle when out of sight
- Promotion of folding bicycles in partnership with manufacturers and retailers

10. Appendix B – Design guidelines

10.1 United States

10.1.1 NACTO Urban Bikeway Design Guide (NACTO, 2011)

Published by the National Association of City Transportation Officials (NACTO). The Guide notes that a typical application of bicycle lanes is on streets with high transit vehicle volume.[16] A typical application for buffered bicycle lanes is near transit stops.[17]

Figure 27 - NACTO guidance on buffered bicycle lanes

A typical application of left-side bicycle lanes is on one-way or median-divided streets with frequent bus stops or loading zones on the right side of the street.[18] Special attention needs to be given for buffered bicycle lanes and all types of cycle tracks (one-way protected, two-way, and raised) at transit stops to avoid pedestrian-bicyclist conflict.[19] Notes that marking the bicycle lane through an intersection promotes the multi-modal nature of a corridor, such as on shared bicycle/bus routes on the network.[20] While not recommended explicitly in the guide, two-stage left turn queue boxes for bicyclists could mitigate transit delay at intersections where most buses travel through and most bicyclists turn left.[21] The Guide notes that bicycle signal heads can

[16] http://nacto.org/cities-for-cycling/design-guide/bike-lanes/conventional-bike-lanes/
[17] http://nacto.org/cities-for-cycling/design-guide/bike-lanes/buffered-bike-lanes/
[18] http://nacto.org/cities-for-cycling/design-guide/bike-lanes/left-side-bike-lanes/
[19] http://nacto.org/cities-for-cycling/design-guide/cycle-tracks/protected-cycle-track/
[20] http://nacto.org/cities-for-cycling/design-guide/intersection-treatments/intersection-crossing-markings/
[21] http://nacto.org/cities-for-cycling/design-guide/intersection-treatments/two-stage-left-turn-queue-boxes/

improve operation of an intersection;[22] therefore, they may be appropriate where bicycle and transit networks overlap. Like the MUTCD, NACTO's guide provides recommendations for way-finding signage that could be used to guide bicyclists to transit stations up to 2 miles away.[23] Recommendations are in accordance with MUTCD guidance, and the NACTO guide adds several graphical examples and case studies.

10.1.2 AASHTO Green Book: A Policy on Geometric Design of Highways and Streets

Published by the American Association of State Highway and Transportation Officials (AASHTO). It encourages consideration of all road users in the engineering phase.

10.1.3 AASHTO Guide for the Development of Bicycle Facilities

Published by AASHTO. Currently in draft form,[24] the 3rd edition of AASHTO's Guide for the Development of Bicycle Facilities includes a section explicitly dealing with the integration of bicycles and transit (Section 2.7). The Guide notes bicycles' ability to expand the reach of transit, and vice versa. It names transit centers as bicycle trip generators. It also suggests promoting the use of bicycles with transit and coordinating bicycle planning with other capital planning projects like light rail or transit stations. In Section 2.7, *Integrating Bicycle Facilities with Transit*, the Guide says that safe and convenient routes should be used as essential support strategies for increasing transit ridership; two- to three-mile catchment areas are appropriate for bicycle access to transit. The guide's four main bicycle-transit integration strategies mirror those in this paper: bicycles on transit, bicycle parking at transit locations, on-street bikeway improvements, and promoting the use of bicycle and transit (note: these strategies do not explicitly include bicycle sharing programs). The guide also promotes the use of a unique treatment – angled back-in parking – to enhance the safety of bicyclists and pedestrians near parking. An image from the guide is below.

[22] http://nacto.org/cities-for-cycling/design-guide/bicycle-signals/bicycle-signal-heads/
[23] http://nacto.org/cities-for-cycling/design-guide/bikeway-signing-marking/bike-route-way-finding-signage-and-markings-system/
[24] http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP_15-37_FR.pdf

Figure 28 - Angled back-in parking from Draft AASHTO Guide for the Development of Bicycle Facilities, p. 76

Facilitating bicycle access on transit vehicles

- Provide access at all reasonable hours
- Provide enough space to meet demand
- Allow easy bicycle access to transit stations (e.g. elevators, bicycle channels, ramps)

Improving bikeways to transit

- Avoid leap-frogging
- Pavement markings for bicycle lanes at bus stops
- Bicycle lanes on the left-hand side of the roadway on one-way streets
- Combine bus/bicycle lanes
- Train bus drivers on proper etiquette
- Educate bicyclists on proper etiquette (can be displayed on outside of bus itself)

Offering bicycle parking at transit locations

- Secure, well-promoted parking at stops and stations
- Provide enough spaces to meet demand
- Include both short- and long-term storage options

Other

- High-capacity on-bus bicycle racks
- Bicycle-on-vanpool services
- Staffed bicycle parking at transit stations
- Increase number of shared bus/bicycle streets and lanes
- Training for bicyclists and bus drivers (e.g. how to load bicycles on bus racks, how to share the road)
- Include bicycle access information on transit maps
- Include transit variables in bicycle performance measures

10.1.4 Federal Manual on Uniform Traffic Control Devices (MUTCD) (FHWA, 2009)

Published by the Federal Highway Administration (FHWA). Provides design standards for bicycle facilities in the United States. No explicit mention of bicycle-transit integration. Transit is not mentioned at all within the bicycle section (Part 9). Way-finding signs, Figure 9B-4, may be used to guide bicyclists along a bicycle route to a transit hub or stop and to bicycle parking. The Shared Lane Marking, or "sharrow," can be used along a transit route, among other places (Section 9C.07). At the approach to minor intersections, the left line of a bicycle lane should be dotted 50 to 200 feet before the approach when there is a bus stop. When the bus stops on the far side of the intersection, the left line of the bicycle lane should be dotted as well (Figure 9C-6).

10.2 International

10.2.1 Dutch CROW Design Manual for Bicycle Traffic

The CROW manual offers some of the most comprehensive guidance on bicycle-transit integration seen in any national guide. Section 5.5 is entitled "Bicycles and public transport" and is divided into two sections; one deals with buses and the other deals with trams and light rail. Table 19 provides a prioritization scheme for separated facilities when bicycles and buses share the same right of way.

Table 19. Function combinations of bicycle and bus traffic

Function of road section for motorised traffic	Function of road section for bicycle traffic: (main) cycle route	Function of road section for bicycle traffic: other routes (basic network)
connecting	- high-speed bus wanted - high requirements for cyclists' comfort → separate cycle and bus	- high-speed bus wanted - no high requirements for cyclists' comfort → separate cycle and bus
access	- no high-speed bus wanted - high requirements for cyclists' comfort → cycle and bus preferably separated, but this is not necessary	- no high-speed bus wanted - no special requirements for cyclists' comfort → separation of cycle and bus not necessary or desirable

Figure 29 - Table 19 (Ploeger, 2007)

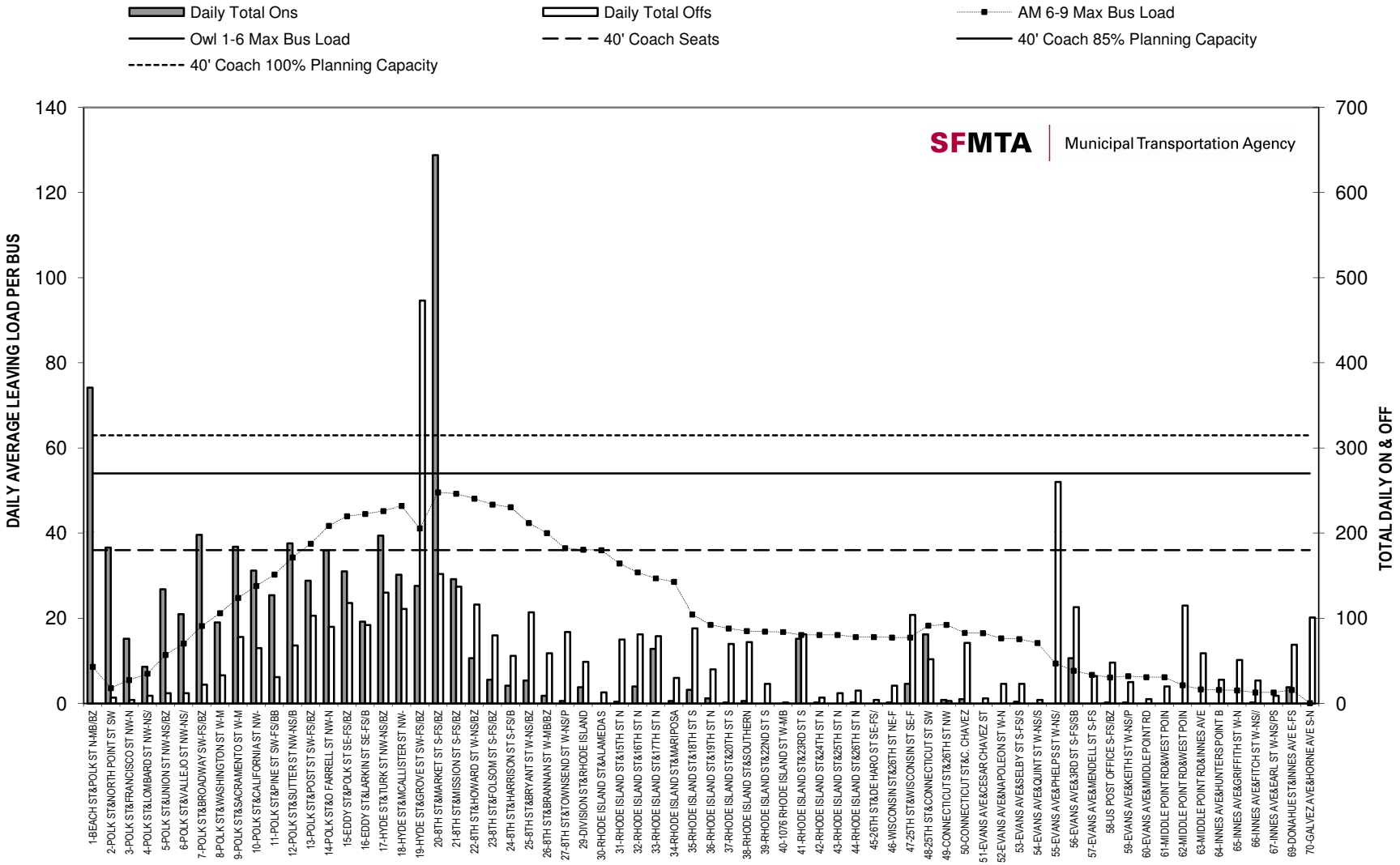
They suggest that separated bicycle facilities should be provided on main and basic bicycle routes when the roadway also functions as a connector. Additionally, separated facilities are preferably provided for access roadways. The only time separation is undesirable would be on basic (not main) bicycle routes on access roads. As an example, Polk Street in San Francisco is a main bicycle route and functions as an access road for automobiles.

The guide also highlights treatments at bus stops, taking stopping buses and crossing pedestrians' interests into account. On main bicycle routes, the potential conflict between a bicyclist and a bus re-entering traffic is viewed as acceptable because speeds are low; however, bus stop bays should be large enough to allow the bus to fully exit the bicycle lane when stopping. Where bicycle lanes are separated from other traffic, it is advised to loop the lane behind the bus stop. In terms of crossing pedestrians, the manual also deems the potential conflict between pedestrians and bicyclists as small given their relative masses. It advises to provide a bus stop platform at least 2 meters wide (if no shelter) and 2.5 meters wide (if a shelter is provided) and that the cycle track should be located at least 0.65 meters from the shelter. The cycle track should be as direct a path as possible to allow visibility.

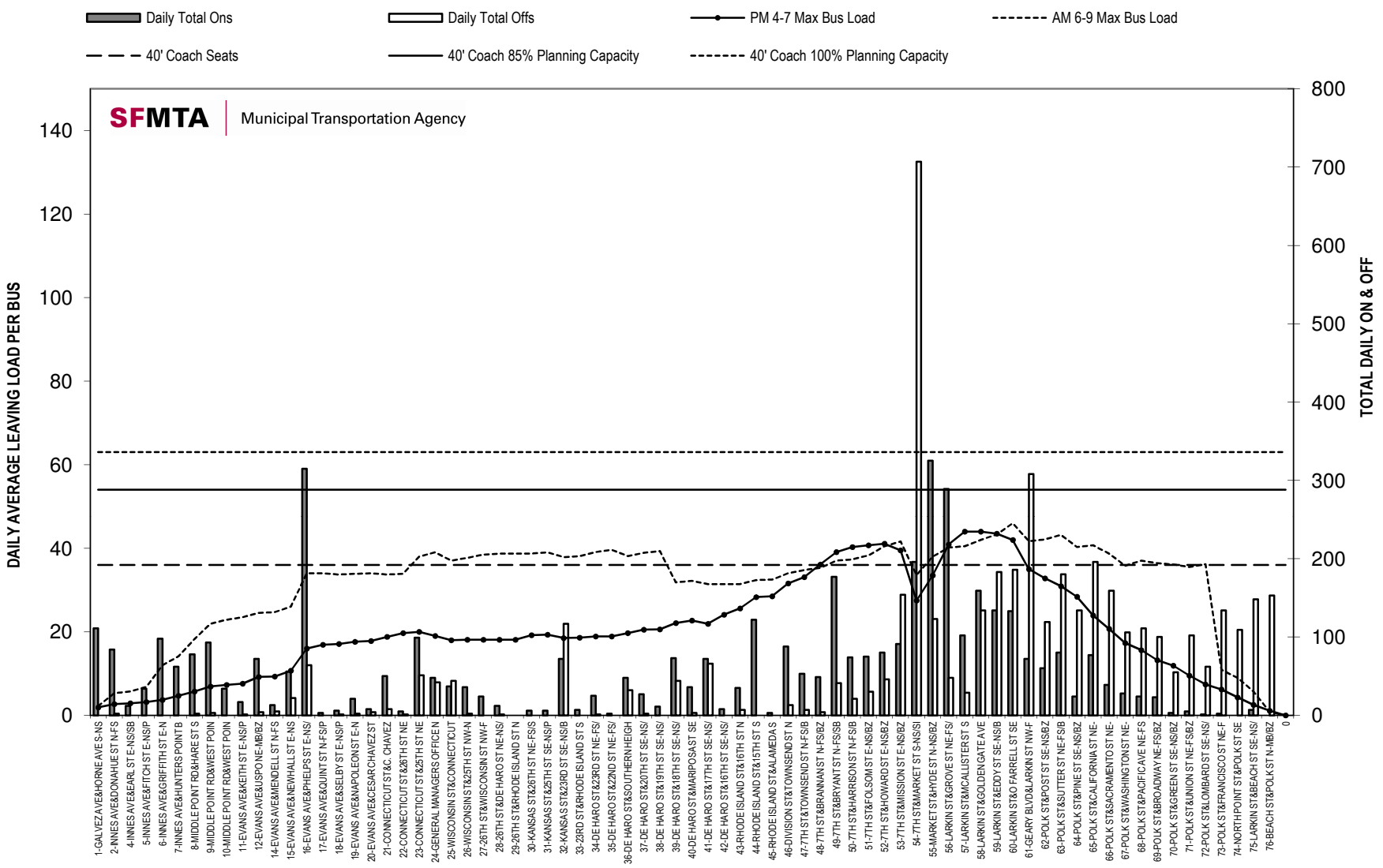
11. Appendix C – 19-Polk Ridership

The charts on the following pages show ridership trends for the 19-Polk in September and October 2010. The first chart shows the southbound direction, demonstrating how riders primarily use the 19-Polk to access downtown (boardings greatly outweigh alightings in this direction until Market Street). The second, northbound chart shows how alightings greatly outweigh boardings in this direction, with a large percentage of riders alighting at Geary – an access point to the 38-Geary and future BRT lines. These charts were produced by SFMTA staff.

BASELINE REPORT ROUTE 0019, WEEKDAY, SEPTEMBER & OCTOBER 2010 OUTBOUND



BASELINE REPORT ROUTE 0019, WEEKDAY, SEPTEMBER & OCTOBER 2010 INBOUND



12. Appendix D – TEP Bicycle Projects

Table 22 - TEP bicycle-related projects as of January 8, 2012

Street	Intersection/Segment	Project
16th Street	Between 7th and Kansas Streets	Move bike lanes to 17th Street as part of transit only lane
	At 7th Street	Reconfigure street for 11'-6" median bus lanes in both directions and 1 10' travel lane each way + 9' EB left-turn lane at 7th (~200' long; transition to 1 lane each way at Missouri) by removing bike lanes and converting north side angled parking to parallel parking
	At Missouri Street	Reconfigure street for 12' median bus lanes in both directions, and 1 10' travel lane each way by removing bike lanes
	At Connecticut Street	Reconfigure street for 12' median bus lanes in both directions, and 1 10' travel lane each way by removing bike lanes
	At Arkansas Street	Reconfigure street for 11'-6" median bus lanes in both directions, and 1 10'6" travel lane each way by removing bike lanes; remove parking as necessary to accommodate stops, travel lane transitions
	At Wisconsin Street	Reconfigure street for 12' median bus lanes in both directions and 1 10' travel lane each way by removing bike lanes; remove parking as necessary to accommodate stops, travel lane transitions
	At Carolina Street	Reconfigure street for 12' median bus lanes in both directions and 1 10' travel lane each way by removing bike lanes
	At De Haro Street	Reconfigure street for 12' median bus lanes in both directions and 1 10' travel lane each way by removing bike lanes
	At Rhode Island Street	Reconfigure street for 11'-6" median bus lanes in both directions and 1 10'6" travel lane each way by removing bike lanes; remove parking as necessary to accommodate stops, travel lane transitions
	At Kansas Street	Reconfigure street for 12' median bus lanes in both directions, and 1 10' travel lane each way by removing

		bike lanes; remove parking as necessary to accommodate stops, travel lane transitions
	Between Moscow and Santos Streets	Remove travel lane in both directions for all-day transit-only lane and bike lane (Moscow to Santos)
Geneva Avenue	At Carter Street	Remove travel lane in both directions for all-day transit-only lane and bike lane (Moscow to Santos)
	At Brookdale Ave	Remove travel lane in both directions for all-day transit-only lane and bike lane (Moscow to Santos)
	At Stoneridge Lane	Remove travel lane in both directions for all-day transit-only lane and bike lane (Moscow to Santos)
	At stop 1650/1651	Remove travel lane in both directions for all-day transit-only lane and bike lane (Moscow to Santos)
	At Prague Street	Remove travel lane in both directions for all-day transit-only lane and bike lane (Moscow to Santos) Install 65’ transit island with bike lane behind island on OB stop
	At Munich Street	Remove travel lane in both directions for all-day transit-only lane and bike lane (Moscow to Santos) Add 65’ transit island with bike lane behind on IB stop
	Between Paris and London Streets	Establish bike lane from Paris to London (no change to number of general traffic lanes)
	At Mission Street	Add 130’ OB transit island from London to 60’ west of Mission with bike lane behind island Install far side IB 130’ far side transit island with bike lane behind island
	Between Mission and Paris Streets	Establish bike lane from Mission to Paris (no change to number of general traffic lanes)

13. Appendix E – Detailed Existing Conditions

Table 23 - Detailed existing conditions for Polk Street

See table on next page.

	From	To	Bicycle volumes	Upcoming bicycle projects	Transit network	19-Polk frequency (weekday)	19-Polk On-time performance	19-Polk boardings/alightings	19-Polk transit stop	Future Van Ness BRT stops	Vehicular volume	Driveways	Bicycle network	Auto Parking	Topography	BSP Classification	Geometric design	Pedestrian Volume (1-yr. modeled)	Pedestrian Volume (5-yr. modeled)	Intersection control	Zoning
Northern	Beach	North Point	Polk & North Point (EB and WB on North Point): 122 cyclists, average 4:30-6:30pm peak September 20, 2011 (automated counters)		19-Polk; intersects with 30-Stockton, 47-Van Ness, 91-Owl at North Point	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	SB AM: 16 on, 0 off SB PM: 96 on, 0 off NB AM: 0 on, 25 off NB PM: 0 on, 19 off	southbound and northbound @ Beach/Polk (shelter on Beach, bus turnaround)				2 bicycle lane west side (uphill direction)	metered parallel parking both sides	10-18% grade; incline southbound	Park Edge	Minor arterial; 44' 9" width; 5' bicycle lane west side	Beach: 948,094 North Point: 2,127,977	Beach: 4,740,469 North Point: 10,639,885	3-way stop @ Beach	C-2 Neighborhood Commercial RM-4 High-density Residential
	North Point	Bay	Polk & North Point (EB and WB on North Point): 122 cyclists, average 4:30-6:30pm peak September 20, 2011 (automated counters)		19-Polk (NB 19-Polk leaves Polk at this point for turnaround); intersects with 30-Stockton, 47-Van Ness, 91-Owl at North Point	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	SB AM: 5 on, 0 off SB PM: 46 on, 0 off NB AM: 1 on, 29 off NB PM: 0 on, 12 off	southbound @ North Point/Polk (shelter); northbound @ North Point/Polk (on North Point eastbound)				8 bicycle lane west side (uphill direction)	un-metered parallel parking both sides	10-18% grade; incline southbound	Park Edge	Minor arterial; 44' 9" width; 6' bicycle lane west side	1,191,664	5,958,318	signalized @ North Point	P, NC-1, RM-3
	Bay	Francisco			19-Polk	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	SB AM: 10 on, 0 off SB PM: 26 on, 0 off NB AM: 0 on, 116 off NB PM: 0 on, 6 off	southbound @ Francisco/Polk; northbound @ Francisco/Polk				8 bicycle lane west side (uphill direction)	un-metered parallel parking both sides		Residential Throughway	Minor arterial; 44' 9" width; 6' bicycle lane west side	123,093	615,463	signalized @ Bay	P, RM-1
	Francisco	Chestnut			19-Polk	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB				SB @ Chestnut Fri 5/12/1995: 3,489 NB @ Chestnut Fri 5/12/1995: 2,522		22 bicycle lane west side (uphill direction)	un-metered parallel parking both sides	5-10% grade; incline southbound	Residential Throughway	Minor arterial; 44' 9" width; 6' bicycle lane west side	382,539	1,912,693	4-way stop @ Francisco	RM-1, RH-2
	Chestnut	Lombard			19-Polk	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	SB AM: 11 on, 0 off SB PM: 4 on, 1 off	Southbound @ Lombard/Polk				25 bicycle lane west side (uphill direction)	un-metered parallel parking both sides	10-18% grade; incline southbound	Commercial Throughway	Minor arterial; 44' 9" width; 6' bicycle lane west side	138,958	694,789	4-way stop @ Chestnut	RM-1, RM-2, RM-3
	Lombard	Greenwich			19-Polk	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	NB AM: 1 on, 13 off NB PM: 0 on, 12 off	northbound @ Lombard/Polk				22 bicycle lanes both sides	un-metered parallel parking both sides	5-10% grade; incline southbound	Commercial Throughway	Minor arterial; 44' 9" width; 5' bicycle lane east and west side; parking lane narrows to 7' (from 8')	189,935	949,674	4-way stop @ Lombard	RM-3, RM-2
	Greenwich	Filbert			19-Polk	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB						16 bicycle lanes both sides	un-metered parallel parking both sides		Commercial Throughway	Minor arterial; 44' 9" width; 5' bicycle lane east and west side; parking lane narrows to 7' (from 8')	687,255	3,436,274	2-way stop on Greenwich	RM-2
	Filbert	Union			19-Polk; intersects with 41-Union, 45-Union-Stockton at Union	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	SB AM: 41 on, 2 off SB PM: 43 on, 9 off NB AM: 9 on, 27 off NB PM: 1 on, 22 off	southbound @ Union/Polk (shelter); northbound @ Union/Polk (no shelter)	@ Union			7 bicycle lanes both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44' 9" width; 5' bicycle lane east and west side; parking lane narrows to 7' (from 8')	2,429,873	12,149,363	4-way stop @ Filbert	NCD
	Union	Green			19-Polk; intersects with 41-Union, 45-Union-Stockton at Union	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB						0 Bike route, no dedicated bike lanes (sharrows both sides); only north-south bike route in this neighborhood	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44'-9" width; two travel lanes with sharrows	1,168,226	5,841,129	At Union: Signalized; At Green: 4-way stop controlled	NCD
	Green	Vallejo			19-Polk	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	SB AM: 33 on, 1 off SB PM: 25 on, 4 off NB AM: 2 on, 11 off NB PM: 3 on, 15 off	Northbound @ Green/Polk (no shelter); Southbound @ Vallejo/Polk (no shelter)			1 minor street intersection (Bonita)	Bike route, no dedicated bike lanes (sharrows both sides); only north-south bike route in this neighborhood	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44'-9" width; two travel lanes with sharrows	2,176,574	10,882,872	At Green: 4-way stop controlled; At Vallejo: 4-way stop controlled	NCD
	Vallejo	Broadway			19-Polk	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	NB AM: 5 on, 14 off NB PM: 3 on, 25 off	Northbound @ Broadway/Polk		SB @ Broadway Tues 3/3/2009: 4,680 NB @ Broadway Tues 3/3/2009: 5,351		1 Bike route, no dedicated bike lanes (sharrows both sides); only north-south bike route in this neighborhood	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44'-9" width; two travel lanes with sharrows	6,980,413	34,902,067	At Vallejo: 4-way stop controlled; At Broadway: Signalized	NCD
	Broadway	Pacific			19-Polk; intersects with 12-Folsom-Pacific (eastbound) and 10-Townsend at Pacific	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	SB AM: 43 on, 1 off SB PM: 40 on, 7 off NB AM: 4 on, 25 off NB PM: 2 on, 15 off	Southbound @ Broadway/Polk (shelter); Northbound @ Pacific/Polk (shelter)				2 Sharrows both sides	metered parallel parking both sides	5-10% grade; incline southbound	Commercial Throughway	Minor arterial; 44'-9" width; two travel lanes with sharrows	7,186,075	35,930,376	At Broadway: Signalized	NCD
	Pacific	Jackson			19-Polk and 12-Folsom-Pacific (southbound); intersects with 12-Folsom-Pacific (eastbound) and 10-Townsend at Pacific	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB			@ Jackson			4 Sharrows both sides	metered parallel parking both sides	5-10% grade; incline southbound	Commercial Throughway	Minor arterial; 44'-9" width; two travel lanes with sharrows	8,483,354	42,416,772	Signalized @ Pacific	NCD
	Jackson	Washington			19-Polk; intersects with the 27-Bryant at Washington	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	SB AM: 30 on, 3 off SB PM: 22 on, 16 off NB AM: 8 on, 14 off SB PM: 3 on, 29 off	Mid-block bulb-out (southbound), no shelter; Northbound @ Washington/Polk				1 Sharrows both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44'-9" width; two travel lanes with sharrows; west-side bus bulb 6' into roadway mid-block	7,690,343	38,451,717	Signalized @ Jackson	NCD
	Washington	Clay			19-Polk; intersects with the 27-Bryant at Washington; intersects with the 1-California (eastbound) at Clay	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB						0 Sharrows both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44'-9" width; two travel lanes with sharrows	5,629,796	28,148,978	Signalized @ Washington	NCD
	Clay	Sacramento			19-Polk; intersects with the 1-California (eastbound) at Clay	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run behind schedule NB and SB	SB AM: 53 on, 10 off SB PM: 45 on, 27 off NB AM: 14 on, 36 off NB PM: 10 on, 50 off	Mid-block bulb-out (southbound), shelter; Northbound @ Sacramento/Polk	@ Sacramento			0 Sharrows both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44'-9" width; two travel lanes with sharrows; west-side bus bulb 6' into roadway mid-block	8,481,727	42,408,637	Signalized @ Clay	NCD

	From	To	Bicycle volumes	Upcoming bicycle projects	Transit network	19-Polk frequency (weekday)	19-Polk On-time performance	19-Polk boardings/alightings	19-Polk transit stop	Future Van Ness BRT stops	Vehicular volume	Driveways	Bicycle network	Auto Parking	Topography	BSP Classification	Geometric design	Pedestrian Volume (1-yr. modeled)	Pedestrian Volume (5-yr. modeled)	Intersection control	Zoning
Central	Sacramento	California			19-Polk; intersects with the 1-California (westbound) at Sacramento; intersects with California Cable Car at California	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run ahead of schedule NB and SB	SB AM: 34 on, 5 off SB PM: 62 on, 18 off NB AM: 14 on, 23 off NB PM: 16 on, 47 off	Bus bulb-out and shelter @ California/Polk (southbound); Northbound @ California/Polk (shelter)				0 Sharrows both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44'-9" width except at southbound approach to California St. narrows to 38' 9"; two travel lanes with sharrows; west-side bus bulb 6' into roadway south end of block	8,301,298	41,506,492	Signalized @ Sacramento	NCD
	California	Pine			19-Polk; intersects with California Cable Car at California	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run ahead of schedule NB and SB						0 Sharrows both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44' 8" width; sharrows both sides	9,217,315	46,086,573	Signalized @ California	NCD
	Pine	Bush			19-Polk	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run ahead of schedule NB and SB	SB AM: 44 on, 8 off SB PM: 63 on, 10 off NB AM: 19 on, 56 off NB PM: 6 on, 36 off	southbound @ Pine/Polk (bulb-out and shelter); northbound @ Pine/Polk				0 Sharrows both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44' 8" width; mid-block intersection with Austin/Frank Norris St.; west-side bus bulb 6' into roadway @ northern end of segment; sharrows	10,569,704	52,848,522	Signalized @ Pine	NCD
	Bush	Sutter	Polk & Sutter (all directions): 336 cyclists, 4:30-6:30pm, September 2011		19-Polk; intersects with 2-Sutter (westbound), 3-Jackson (westbound), 76-Marin Headlands (westbound) at Sutter	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run ahead of schedule NB and SB	SB AM: 43 on, 6 off SB PM: 46 on, 17 off NB AM: 16 on, 31 off NB PM: 14 on, 31 off	southbound @ Sutter/Polk (bulb-out and shelter); Northbound @ Sutter/Polk (shelter)	@ Sutter			0 Sharrows both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; mid-block intersection with Fern St.; 44' 9" width; west-side bus bulb 6' into roadway at southern end of segment; sharrows	13,011,056	65,055,279	Signalized @ Bush	NCD
	Sutter	Post	Polk & Sutter (all directions): 336 cyclists, 4:30-6:30pm, September 2011		19-Polk; intersects with 2-Sutter (westbound), 3-Jackson (westbound), 76-Marin Headlands (westbound) at Sutter; intersects with 2-Sutter (eastbound), 3-Jackson (eastbound), 76-Marin Headlands (eastbound) at Post	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am	Tends to run ahead of schedule NB and SB						0 Sharrows both sides	metered parallel parking both sides	5-10% grade; incline northbound	Commercial Throughway	Minor arterial; mid-block intersection with Hemlock St.; sharrows; 44' 9" width	11,899,564	59,497,819	Signalized @ Sutter	NCD
	Post	Geary			19-Polk (NB 19-Polk enters Polk here from the east of Geary); intersects with 2-Sutter (eastbound), 3-Jackson (eastbound), 76-Marin Headlands (eastbound) at Post	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am		SB AM: 45 on, 16 off SB PM: 31 on, 25 off NB AM: 14 on, 22 off NB PM: 7 on, 32 off	Northbound @ Post/Polk (no shelter); Southbound @ Post/Polk (no shelter)		SB @ Post Wed 1/17/2001: 9,820 NB @ Post Wed 1/17/2001: 5,311		0 bicycle lanes both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; 44' 9" width; 13' lane on both sides combined edge and bike lane	13,516,379	67,581,897	Signalized @ Post	RC-4
	Geary	O'Farrell			19-Polk; intersects with 38-Geary and 38L (westbound) at Geary; intersects with 38-Geary and 38L (eastbound) at O'Farrell	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am		SB AM: 56 on, 2 off SB PM: 42 on, 32 off	Southbound @ O'Farrell/Polk (no shelter)	@ Myrtle / Alice B Toklas			2 bicycle lanes both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; mid-block intersection with Alice B Toklas; 48' 9" width; 13' shared edge and bike lane	11,430,238	57,151,192	Signalized @ Geary	NC-3, RC-4
	O'Farrell	Ellis			19-Polk; intersects with 38-Geary and 38L (eastbound) at O'Farrell	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am							6 bicycle lanes both sides	metered parallel parking both sides	5-10% grade; incline northbound	Commercial Throughway	Minor arterial; mid-block intersection with Olive St.; 48' 9" width; 13' shared edge and bike lane	11,199,371	55,996,856	Signalized @ O'Farrell	NC-3
	Ellis	Eddy			SB 19-Polk leaves Polk at Eddy (turns east to Hyde); Polk intersects with 31-Balboa (eastbound)	first trip 5:15am; every 15 minutes (7am - 6pm); every 20 minutes (6pm-9pm); every 30 minutes (9pm-1am); last trip 12:45am		SB AM: 20 on, 31 off SB PM: 19 on, 34 off	Southbound @ Eddy/Polk (on Eddy, with shelter)	@ Eddy			2 bicycle lanes both sides	metered parallel parking both sides		Commercial Throughway	Minor arterial; mid-block intersection with Willow St.; 48' 9" width; 13' shared edge and bike lane	9,951,672	49,758,358	Signalized @ Ellis	NC-3, RC-4
	Eddy	Turk			Intersects with 16X-Noriega (westbound) at Turk								3 bicycle lanes both sides	metered parallel parking both sides	5-10% grade; incline northbound	Commercial Throughway	Minor arterial; 48' 9" width; 13' shared edge and bike lane	24,867,411	124,337,054	Signalized @ Eddy	RC-4, NC-3
	Turk	Golden Gate			Intersects with 16X-Noriega (westbound) at Turk; intersects with 16X-Noriega (eastbound) at Golden Gate						SB @ Turk Friday 1/26/2001: 10,980 NB @ Turk Friday 1/26/2001: 1, 454		1 bicycle lanes both sides	metered parking west side; east side no parking		Commercial Throughway	Minor arterial; mid-block intersection with Elm St.; 5' curbside bike lane east side; 2 southbound (9'-9" center, 10' side), 1 northbound (11') vehicle lanes; 5' bike lane west side; 8' parking lane west side; 48-9" width	8,208,716	41,043,581	Signalized @ Turk	P, RC-4
Southern	Golden Gate	McAllister	McAllister & Polk (all directions): 497 cyclists, 4:30-6:30pm, September 2011		Intersects with 16X-Noriega (eastbound) at Golden Gate; intersects with 5-Fulton at McAllister					@ McAllister			1 bicycle lanes both sides	white zone west side (5 minute loading/unloading only); no parking east side		Downtown Commercial	Minor arterial; mid-block intersection with Redwood St.; 5' curbside bike lane east side; 2 southbound (9'-9" center, 10' side), 1 northbound (11') vehicle lanes; 5' bike lane west side; 8' parking lane west side; 48-9" width	7,474,130	37,370,651	Signalized @ Golden Gate	P
	McAllister	Grove	McAllister & Polk (all directions): 497 cyclists, 4:30-6:30pm, September 2011 Polk & Grove (all directions): 373 cyclists, 4:30-6:30pm, September 2011 Polk & Grove: approx. 20% of cyclists exhibit illegal behavior, split between wrong-way riding, wrong-way sidewalk riding, and sidewalk riding Polk & Grove (all directions): 373 cyclists, 4:30-6:30pm, September 2011	Polk St. contraflow bicycle lane (expected FY 2013/2014)	Intersects with 5-Fulton at McAllister								0 bicycle lanes west side	un-metered parking; parallel west side, angled east side; SFPark meters		Ceremonial / Civic	Minor arterial; mid-block crosswalk (to City Hall); roadway widens to 71'; southbound: 9' parking lane, 5' bike lane, 2-11' travel lanes; northbound: 1 travel lane and angled parking	7,871,126	39,355,631	Signalized @ McAllister	P
	Grove	Hayes	EB on Grove: 133 cyclists, 4:30-6:30pm, September 20, 2011	Polk St. contraflow bicycle lane (expected FY 2013/2014)	21-Hayes (southbound); intersections with 21-Hayes (westbound)			21-Hayes EB AM: 2 on, 14 off 21-Hayes EB PM: 1 on, 11 off	21-Hayes stop on Grove @ Grove/Polk				3 bicycle lane west side	metered parallel parking both sides; SFPark meters		Downtown Commercial	Minor arterial; one-way southbound; mid-block intersection with Ivy St.; 5' bike lane and 9' parking lane southbound until Ivy, 4' bike lane and 10' RTL thereafter; total width 48'-9"	5,793,980	28,969,900	Signalized @ Grove	P, C-3-G
	Hayes	Market		Polk St. contraflow bicycle lane (expected FY 2013/2014)	21-Hayes (southbound); intersections with 21-Hayes (westbound)					@ Market	SB @ Hayes Friday 1/5/2007: 14,396		bicycle lane west side; lane crosses median into crosswalk, connects with 4 westbound Market St.	metered parking west side; limited parking east side; SFPark meters		Downtown Commercial	Minor arterial; 48'-9" width; 8' west side parking lane, 5' bike lane, 2 travel lanes 13' and 10' trasition to 2-12' lanes @ Market	6,057,437	30,287,187	Signalized @ Hayes and Market	C-3-G

	From	To	Bicycle volumes	Upcoming bicycle projects	Transit network	19-Polk frequency (weekday)	19-Polk On-time performance	19-Polk boardings/alightings	19-Polk transit stop	Future Van Ness BRT stops	Vehicular volume	Driveways	Bicycle network	Auto Parking	Topography	BSP Classification	Geometric design	Pedestrian Volume (1-yr. modeled)	Pedestrian Volume (5-yr. modeled)	Intersection control	Zoning
	Source		*2011 Bicycle Count Report*	*2011 Bicycle Count Report*	*SFMTA route maps online (http://www.sfmta.com/cms/asystem/routelist.php)*	*SFMTA Weekday Frequency Guide: http://www.sfmta.com/cms/mroutes/WeekdayFrequencyGuide.htm*	*Documentation from 2006; Andrew Lee SFMTA staff*	*TEP Data Collection using APC, Fall 2006-Spring 2007: http://www.sfmta.com/cms/rtep/tepdatainde.htm; SFMTA APC boarding data from September/October 2010*	*Google Maps; SFMTA GIS files*		*SFMTA Traffic Count Data: http://www.sfmta.com/cms/rtraffic/documents/adtcounts.accessible3.pdf*	*Google Maps*	*Google Maps*	*Google Maps*	*San Francisco Bike Map and Walking Guide, 2010; Google Maps*	*Better Streets Plan; SF Planning Department March 2012 draft map*	*Google Maps; SFMTA Striping Drawings*	*SFMTA Pedestrian Volume Model*	*SFMTA Pedestrian Volume Model*	*Google Maps*	*San Francisco Zoning Map February 2012*

13. Appendix E – Detailed Existing Conditions

Table 23 - Detailed existing conditions for Polk Street

See table on next page.

14. Appendix F – Transit First Policy

Section 8A.115 of the San Francisco Charter states:

(a) The following principles shall constitute the City and County's transit-first policy and shall be incorporated into the General Plan of the City and County. All officers, boards, commissions, and departments shall implement these principles in conducting the City and County's affairs:

1. To ensure quality of life and economic health in San Francisco, the primary objective of the transportation system must be the safe and efficient movement of people and goods.

2. Public transit, including taxis and vanpools, is an economically and environmentally sound alternative to transportation by individual automobiles. Within San Francisco, travel by public transit, by bicycle and on foot must be an attractive alternative to travel by private automobile.

3. Decisions regarding the use of limited public street and sidewalk space shall encourage the use of public rights of way by pedestrians, bicyclists, and public transit, and shall strive to reduce traffic and improve public health and safety.

4. Transit priority improvements, such as designated transit lanes and streets and improved signalization, shall be made to expedite the movement of public transit vehicles (including taxis and vanpools) and to improve pedestrian safety.

5. Pedestrian areas shall be enhanced wherever possible to improve the safety and comfort of pedestrians and to encourage travel by foot.

6. Bicycling shall be promoted by encouraging safe streets for riding, convenient access to transit, bicycle lanes, and secure bicycle parking.

7. Parking policies for areas well served by public transit shall be designed to encourage travel by public transit and alternative transportation.

8. New transportation investment should be allocated to meet the demand for public transit generated by new public and private commercial and residential developments.

9. The ability of the City and County to reduce traffic congestion depends on the adequacy of regional public transportation. The City and County shall promote the use of regional mass transit and the continued development of an integrated, reliable, regional public transportation system.

10. The City and County shall encourage innovative solutions to meet public transportation needs wherever possible and where the provision of such service will not adversely affect the service provided by the Municipal Railway.

(b) The City may not require or permit off-street parking spaces for any privately-owned structure or use in excess of the number that City law would have allowed for the structure or use on July 1, 2007 unless the additional spaces are approved by a four-fifths vote of the Board of Supervisors. The Board of Supervisors may reduce the maximum parking required or permitted by this section.

(Amended by Proposition A, Approved 11/6/2007)

15. Appendix G – SWITRS Historic Collision Data

Table 24 - SWITRS data on bus-bicycle, bus-pedestrian, auto-bicycle, auto-pedestrian, and bicycle-pedestrian collisions, 2006-2010

See table on next page.

PRIMARY STREET	SECONDARY STREET	SEGMENT	DISTANCE (FT)	DIRECTION	DATE	TIME	COLLISION TYPE	INVOLVED	EXTENT	PRIMARY COLLISION FACTOR	LIGHTING	PARTY1	PARTY2	DIRECTION OF TRAVEL1	DIRECTION OF TRAVEL2	MOVEMENT1	MOVEMENT2	MUNI INVOLVED
Mcallister Street	Polk Street	Southern	0	Not Stated	11/26/2007	5:27 PM	Broadside	Bicycle	Complaint of Pain	Other Hazardous Movement	Dark - Street Lights	Bicyclist	Driver	South	West	Proceeding Straight	Proceeding Straight	0
Mcallister Street	Polk Street	Southern	0	Not Stated	4/26/2010	4:46 PM	Other	Bicycle	Other Visible Injury	Pedestrian Violation	Daylight	Pedestrian	Bicyclist	South	Not Stated	Other	Making Right Turn	0
Polk Street	Grove Street	Southern	9	North	11/13/2007	2:25 PM	Sideswipe	Bicycle	Other Visible Injury	Improper Turning	Daylight	Driver	Bicyclist	South	South	Making Right Turn	Proceeding Straight	0
Polk Street	Grove Street	Southern	303	North	12/17/2007	11:57 AM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Ped R/W Violation	Daylight	Driver	Pedestrian	South	East	Proceeding Straight	Proceeding Straight	0
Polk Street	Grove Street	Southern	18	North	1/12/2010	10:00 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Injury	Pedestrian Violation	Daylight	Pedestrian	Driver	West	North	Proceeding Straight	Making Right Turn	0
Polk Street	Hayes Street	Southern	0	Not Stated	9/26/2009	7:26 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Pedestrian Violation	Daylight	Pedestrian	Driver	South	West	Proceeding Straight	Proceeding Straight	0
Polk Street	Mcallister Street	Southern	0	Not Stated	3/15/2007	11:09 PM	Sideswipe	Bicycle	Complaint of Pain	Auto R/W Violation	Dark - Street Lights	Driver	Bicyclist	East	East	Making Left Turn	Proceeding Straight	0
Polk Street	Mcallister Street	Southern	118	North	2/11/2010	2:02 PM	Sideswipe	Bicycle	Complaint of Pain	Other Hazardous Movement	Daylight	Driver	Bicyclist	South	West	Proceeding Straight	Proceeding Straight	0
Polk Street	Mcallister Street	Southern	0	Not Stated	5/4/2010	11:00 AM	Broadside	Bicycle	Other Visible Injury	Wrong Side of Road	Daylight	Bicyclist	Driver	South	South	Proceeding Straight	Making Left Turn	0
Polk Street	Mcallister Street	Southern	5	North	7/3/2007	3:29 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Pedestrian Violation	Daylight	Pedestrian	Driver	West	North	Proceeding Straight	Stopped in Road	0
Polk Street	Mcallister Street	Southern	0	Not Stated	9/13/2007	10:25 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	North	East	Making Right Turn	Proceeding Straight	0
Polk Street	Mcallister Street	Southern	200	South	11/6/2006	3:20 PM	Vehicle - Pedestrian	Pedestrian	Severe Injury	Ped R/W Violation	Daylight	Bicyclist	Pedestrian	North	West	Proceeding Straight	Other	0
Bay Street	Polk Street	Northern	19	East	2/11/2006	4:40 PM	Sideswipe	Bicycle	Complaint of Pain	Unsafe Lane Change	Daylight	Driver	Bicyclist	East	East	Changing Lanes	Proceeding Straight	0
Bay Street	Polk Street	Northern	185	West	12/5/2007	1:10 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Pedestrian Violation	Daylight	Pedestrian	Driver	South	East	Proceeding Straight	Proceeding Straight	0
Filbert Street	Polk Street	Northern	0	Not Stated	9/10/2010	8:12 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Daylight	Driver	Pedestrian	West	North	Proceeding Straight	Proceeding Straight	0
North Point Street	Polk Street	Northern	28	West	7/6/2009	9:50 PM	Head-On	Bicycle	Other Visible Injury	Wrong Side of Road	Dark - Street Lights	Bicyclist	Driver	East	West	Proceeding Straight	Proceeding Straight	0
Polk Street	Chestnut Street	Northern	0	Not Stated	2/8/2007	1:35 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Ped R/W Violation	Daylight	Driver	Pedestrian	East	West	Making Left Turn	Proceeding Straight	0
Polk Street	Filbert Street	Northern	0	Not Stated	7/4/2010	9:52 PM	Broadside	Bicycle	Severe Injury	Traffic Signals and Signs	Dark - Street Lights	Bicyclist	Driver	South	East	Proceeding Straight	Proceeding Straight	0
Polk Street	Francisco Street	Northern	0	Not Stated	9/23/2007	5:35 PM	Broadside	Bicycle	Complaint of Pain	Traffic Signals and Signs	Daylight	Bicyclist	Driver	North	West	Proceeding Straight	Proceeding Straight	0
Broadway	Polk Street	Central	85	East	11/11/2006	2:35 AM	Vehicle - Pedestrian	Pedestrian	Severe Injury	Pedestrian Violation	Dark - Street Lights	Pedestrian	Driver	North	East	Not Stated	Proceeding Straight	0
Bush Street	Polk Street	Central	8	East	5/1/2009	8:19 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	East	North	Making Left Turn	Not Stated	0
Eddy Street	Polk Street	Central	6	West	2/26/2007	9:40 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Daylight	Driver	Pedestrian	North	Not Stated	Making Left Turn	Not Stated	0
Eddy Street	Polk Street	Central	0	Not Stated	7/24/2007	9:51 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Pedestrian Violation	Dark - Street Lights	Pedestrian	Driver	East	Not Stated	Parked	Not Stated	0
Ellis Street	Polk Street	Central	0	Not Stated	8/30/2006	2:15 PM	Broadside	Bicycle	Other Visible Injury	Auto R/W Violation	Daylight	Driver	Bicyclist	North	South	Making Left Turn	Proceeding Straight	0
Geary Street	Polk Street	Central	0	Not Stated	2/6/2008	9:40 AM	Broadside	Bicycle	Other Visible Injury	Auto R/W Violation	Daylight	Driver	Bicyclist	West	South	Making Left Turn	Proceeding Straight	0
Geary Street	Polk Street	Central	28	West	2/1/2009	2:30 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Pedestrian Violation	Daylight	Pedestrian	Driver	South	West	Proceeding Straight	Proceeding Straight	0
Geary Street	Polk Street	Central	6	East	2/6/2009	6:29 AM	Vehicle - Pedestrian	Pedestrian	Severe Injury	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	West	South	Making Left Turn	Proceeding Straight	0
Ofarrell Street	Polk Street	Central	50	West	10/23/2009	9:24 AM	Sideswipe	Bicycle	Property Damage Only	Other Hazardous Movement	Daylight	Parked Vehicle	Driver	East	East	Parked	Proceeding Straight	0
Pine Street	Polk Street	Central	0	Not Stated	8/1/2008	6:40 PM	Not Stated	Bicycle	Complaint of Pain	Traffic Signals and Signs	Daylight	Driver	Bicyclist	West	South	Proceeding Straight	Proceeding Straight	0
Polk Street	Broadway	Central	45	North	8/18/2008	4:36 PM	Broadside	Bicycle	Other Visible Injury	Auto R/W Violation	Daylight	Driver	Bicyclist	West	Not Stated	Making Left Turn	Proceeding Straight	0
Polk Street	Broadway	Central	0	Not Stated	12/4/2008	10:16 PM	Broadside	Bicycle	Other Visible Injury	Improper Turning	Dark - Street Lights	Driver	Bicyclist	South	South	Making Right Turn	Proceeding Straight	0
Polk Street	Broadway	Central	0	Not Stated	10/13/2009	7:05 AM	Broadside	Bicycle	Complaint of Pain	Auto R/W Violation	Dark - Street Lights	Driver	Bicyclist	South	North	Making Left Turn	Proceeding Straight	0
Polk Street	Broadway	Central	0	Not Stated	2/9/2010	5:48 PM	Broadside	Bicycle	Complaint of Pain	Auto R/W Violation	Dark - Street Lights	Driver	Bicyclist	South	North	Making Left Turn	Proceeding Straight	0
Polk Street	Broadway	Central	0	Not Stated	2/14/2010	4:30 AM	Overturned	Bicycle	Complaint of Pain	Improper Turning	Dark - Street Lights	Driver	Bicyclist	East	North	Making Right Turn	Proceeding Straight	0
Polk Street	Broadway	Central	22	South	7/11/2010	10:15 AM	Broadside	Bicycle	Other Visible Injury	Improper Turning	Daylight	Bicyclist	Driver	East	North	Making Right Turn	Stopped	0
Polk Street	Broadway	Central	0	Not Stated	7/14/2010	2:10 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Ped R/W Violation	Daylight	Driver	Pedestrian	East	North	Making Left Turn	Proceeding Straight	0
Polk Street	Broadway	Central	36	South	1/14/2010	12:07 PM	Hit Object	Other Object	Other Visible Injury	Unsafe Speed	Daylight	Driver	Pedestrian	North	West	Proceeding Straight	Entering Traffic	0
Polk Street	California Street	Central	17	North	7/24/2010	8:35 AM	Other	Bicycle	Other Visible Injury	Improper Turning	Daylight	Driver	Bicyclist	South	South	Making Right Turn	Proceeding Straight	0
Polk Street	California Street	Central	0	Not Stated	9/5/2008	11:00 AM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Ped R/W Violation	Daylight	Driver	Pedestrian	South	South	Making Left Turn	Proceeding Straight	0
Polk Street	Cedar Street	Central	20	North	11/7/2006	5:55 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Pedestrian Violation	Dark - Street Lights	Driver	Pedestrian	North	West	Entering Traffic	Proceeding Straight	0
Polk Street	Clay Street	Central	132	South	9/1/2010	8:30 PM	Other	Bicycle	Complaint of Pain	Improper Passing	Dark - Street Lights	Bicyclist	Driver	South	South	Proceeding Straight	Making Right Turn	1
Polk Street	Eddy Street	Central	0	Not Stated	2/8/2008	11:05 AM	Head-On	Bicycle	Other Visible Injury	Auto R/W Violation	Daylight	Driver	Bicyclist	South	North	Making Left Turn	Proceeding Straight	0
Polk Street	Eddy Street	Central	0	Not Stated	1/27/2010	5:50 PM	Broadside	Bicycle	Complaint of Pain	Traffic Signals and Signs	Dark - Street Lights	Bicyclist	Driver	South	West	Making Left Turn	Proceeding Straight	0
Polk Street	Eddy Street	Central	63	North	10/20/2010	6:36 PM	Sideswipe	Bicycle	Other Visible Injury	Other Hazardous Movement	Dark - Street Lights	Driver	Bicyclist	South	South	Parked	Proceeding Straight	0
Polk Street	Eddy Street	Central	0	Not Stated	3/10/2007	6:55 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	Not Stated	West	Proceeding Straight	Not Stated	0
Polk Street	Eddy Street	Central	3	South	8/28/2008	4:20 PM	Not Stated	Pedestrian	Complaint of Pain	Traffic Signals and Signs	Daylight	Driver	Pedestrian	North	East	Proceeding Straight	Proceeding Straight	0
Polk Street	Eddy Street	Central	0	Not Stated	7/11/2008	4:10 PM	Vehicle - Pedestrian	Pedestrian	Severe Injury	Pedestrian Violation	Daylight	Pedestrian	Driver	West	North	Proceeding Straight	Proceeding Straight	0
Polk Street	Ellis Street	Central	0	Not Stated	4/15/2010	1:18 PM	Broadside	Bicycle	Other Visible Injury	Improper Turning	Daylight	Driver	Bicyclist	West	South	Making Right Turn	Proceeding Straight	0
Polk Street	Ellis Street	Central	0	Not Stated	5/10/2010	7:17 PM	Broadside	Bicycle	Complaint of Pain	Unsafe Speed	Daylight	Bicyclist	Driver	South	East	Proceeding Straight	Making Right Turn	0
Polk Street	Ellis Street	Central	0	Not Stated	5/24/2010	8:56 PM	Broadside	Bicycle	Other Visible Injury	Unsafe Speed	Dark - Street Lights	Bicyclist	Driver	South	North	Proceeding Straight	Making Left Turn	0
Polk Street	Ellis Street	Central	24	North	8/3/2010	11:06 AM	Other	Non-Collision	Complaint of Pain	Unsafe Speed	Daylight	Bicyclist	Driver	South	South	Proceeding Straight	Making Left Turn	0
Polk Street	Ellis Street	Central	0	Not Stated	10/20/2010	4:32 PM	Sideswipe	Bicycle	Other Visible Injury	Improper Passing	Daylight	Bicyclist	Driver	South	South	Passing	Making Right Turn	0
Polk Street	Ellis Street	Central	0	Not Stated	3/17/2007	11:57 AM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Pedestrian Violation	Daylight	Pedestrian	Driver	South	West	Not Stated	Proceeding Straight	0
Polk Street	Ellis Street	Central	30	North	10/6/2008	6:13 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Unsafe Lane Change	Daylight	Driver	Pedestrian	South	South	Proceeding Straight	Proceeding Straight	0
Polk Street	Elm Street	Central	0	Not Stated	3/23/2007	9:00 AM	Hit Object	Bicycle	Other Visible Injury	Auto R/W Violation	Daylight	Driver	Bicyclist	North	South	Making Left Turn	Proceeding Straight	0
Polk Street	Geary Street	Central	0	Not Stated	2/21/2007	8:25 AM	Broadside	Bicycle	Other Visible Injury	Improper Turning	Daylight	Driver	Bicyclist	South	South	Making Right Turn	Proceeding Straight	0
Polk Street	Geary Street	Central	0	Not Stated	10/25/2008	1:40 AM	Other	Bicycle	Complaint of Pain	Lights	Dark - Street Lights	Bicyclist	Driver	South	West	Proceeding Straight	Making Left Turn	0
Polk Street	Geary Street	Central	0	Not Stated	9/3/2009	9:33 PM	Vehicle - Pedestrian	Bicycle	Other Visible Injury	Traffic Signals and Signs	Dark - Street Lights	Driver	Bicyclist	West	South	Making Left Turn	Proceeding Straight	0
Polk Street	Geary Street	Central	0	Not Stated	9/16/2009	8:42 PM	Broadside	Bicycle	Other Visible Injury	Improper Turning	Dark - Street Lights	Driver	Bicyclist	West	South	Making Left Turn	Proceeding Straight	0
Polk Street	Geary Street	Central	120	North	10/14/2009	8:00 AM	Sideswipe	Bicycle	Other Visible Injury	Improper Turning	Daylight	Driver	Bicyclist	South	South	Changing Lanes	Proceeding Straight	0
Polk Street	Geary Street	Central	0	Not Stated	4/19/2010	8:30 AM	Broadside	Bicycle	Other Visible Injury	Auto R/W Violation	Daylight	Driver	Bicyclist	North	South	Making Left Turn	Proceeding Straight	0
Polk Street	Geary Street	Central	0	Not Stated	4/23/2010	5:33 PM	Non-Collision	Bicycle	Other Visible Injury	Not Driver	Daylight	Bicyclist	Driver	South	South	Proceeding Straight	Proceeding Straight	0
Polk Street	Geary Street	Central	17	North	6/25/2010	2:00 PM	Sideswipe	Bicycle	Complaint of Pain	Improper Turning	Daylight	Driver	Bicyclist	South	Not Stated	Making Right Turn	Proceeding Straight	0
Polk Street	Geary Street	Central	23	North	2/23/2010	5:08 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Pedestrian Violation	Dark - Street Lights	Pedestrian	Driver	North	North	Other	Backing	0
Polk Street	Geary Street	Central	0	Not Stated	4/1/2009	12:05 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Pedestrian Violation	Dark - Street Lights	Pedestrian	Bicyclist	East	South	Proceeding Straight	Proceeding Straight	0
Polk Street	Golden Gate Avenue	Central	0	Not Stated	4/24/2006	8:00 AM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Ped R/W Violation	Daylight	Driver	Pedestrian	South	East	Making Right Turn	Proceeding Straight	0
Polk Street	Jackson Street	Central	7	South	3/8/2010	10:29 AM	Not Stated	Bicycle	Other Visible Injury	Other Hazardous Movement	Daylight	Parked Vehicle	Bicyclist	South	South	Parked	Proceeding Straight	0
Polk Street	Jackson Street	Central	29	North	1/24/2010	6:10 PM	Overturned	Parked Vehicle	Other Visible Injury	Starting/Backing	Dark - Street Lights	Driver	Pedestrian	North	Not Stated	Backing	Other	0
Polk Street	Jackson Street	Central	10	North	9/10/2010	10:53 PM	Vehicle - Pedestrian	Pedestrian	Property Damage Only	Pedestrian Violation	Dark - Street Lights	Pedestrian	Driver	West	South	Proceeding Straight	Proceeding Straight	0
Polk Street	Myrtle Street	Central	0	Not Stated	1/29/2006	7:25 PM	Broadside	Bicycle	Complaint of Pain	Lights	Dark - Street Lights	Bicyclist	Driver	South	East	Proceeding Straight	Making Left Turn	0
Polk Street	Myrtle Street	Central	0	Not Stated	1/15/2009	12:38 AM	Rear-End	Bicycle	Other Visible Injury	Auto R/W Violation	Dark - Street Lights	Driver	Bicyclist	East	South	Making Right Turn	Proceeding Straight	0
Polk Street	Myrtle Street	Central	28	South	4/11/2008	8:33 AM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Pedestrian Violation	Daylight	Pedestrian	Not Stated	West	North	Proceeding Straight	Proceeding Straight	0
Polk Street	Ofarrell Street	Central	0	Not Stated	9/14/2006	8:45 AM	Broadside	Bicycle	Other Visible Injury	Traffic Signals and Signs	Daylight	Driver	Bicyclist	East	South	Proceeding Straight	Proceeding Straight	0
Polk Street	Ofarrell Street	Central	0	Not Stated	2/13/2009	5:37 PM	Vehicle - Pedestrian	Bicycle	Complaint of Pain	Unknown	Dark - Street Lights	Bicyclist	Driver	North	East	Proceeding Straight	Proceeding Straight	0
Polk Street	Ofarrell Street	Central	82	North	4/16/2006	11:00 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Pedestrian Violation	Dark - Street Lights	Pedestrian	Driver	East	North	Proceeding Straight	Proceeding Straight	0
Polk Street	Ofarrell Street	Central	0	Not Stated	11/26/2008	11:30 AM	Vehicle - Pedestrian	Pedestrian	Severe Injury	Ped R/W Violation	Daylight	Driver	Pedestrian	South	North	Making Left Turn	Proceeding Straight	0
Polk Street	Ofarrell Street	Central	60	South	9/19/2009	10:07 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Pedestrian Violation	Dark - Street Lights	Pedestrian	Driver	West	South	Proceeding Straight	Proceeding Straight	0
Polk Street	Ofarrell Street	Central	0	Not Stated	3/3/2010	1:42 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	North	East	Making Left Turn	Proceeding Straight	0
Polk Street	Pacific Avenue	Central	50	South	3/6/2008	9:30 AM	Sideswipe	Bicycle	Complaint of Pain	Improper Turning	Daylight	Driver	Bicyclist	North	North	Stopped in Road	Passing Other Vehicle	0
Polk Street	Pine Street	Central	0	Not Stated	11/7/2008	1:42 PM	Other	Bicycle	Other Visible Injury	Other Hazardous Movement	Daylight	Driver	Bicyclist	South	South	Parking Maneuver	Proceeding Straight	0
Polk Street	Pine Street	Central	0	Not Stated	12/30/2006	2:10 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Daylight	Driver	Pedestrian	West	East	Making Left Turn	Proceeding Straight	0
Polk Street	Pine Street	Central	0	Not Stated	2/12/2008	2:55 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Daylight	Driver	Pedestrian	South	East	Making Left Turn	Proceeding Straight	0
Polk Street	Pine Street	Central	11	South	1/1/2010	6:59 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	South	East	Making Left Turn	Proceeding Straight	0
Polk Street	Pine Street	Central	0	Not Stated	12/17/2010	6:35 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	South	East	Making Left Turn	Proceeding Straight	0
Polk Street	Post Street	Central	0	Not Stated	4/16/2010	8:05 AM	Broadside	Other Vehicle	Complaint of Pain	Traffic Signals and Signs	Daylight	Driver	Driver	North	East	Proceeding Straight	Proceeding Straight	0
Polk Street	Sacramento Street	Central	10	North	1/19/2007	10:05 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Pedestrian Violation	Dark - Street Lights	Pedestrian	Driver	West	South	Not Stated	Proceeding Straight	0
Polk Street	Sutter Street	Central	70	South	10/12/2006	8:26 AM	Broadside	Bicycle	Other Visible Injury	Wrong Side of Road	Daylight	Bicyclist	Driver	West	South	Traveling Wrong Way	Proceeding Straight	0
Polk Street	Sutter Street	Central	20	North	5/29/2009	8:54 AM	Rear-End	Bicycle	Other Visible Injury	Unsafe Speed	Daylight	Bicyclist	Driver	South	South	Proceeding Straight	Not Stated	0
Polk Street	Sutter Street	Central	42	South	9/29/2008	12:50 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Driving Under Influence	Dark - Street Lights	Driver	Pedestrian	North	East	Proceeding Straight	Proceeding Straight	0
Polk Street	Sutter Street	Central	0	Not Stated	3/9/2010	11:20 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	West	West	Making Left Turn	Not Stated	0

PRIMARY STREET	SECONDARY STREET	SEGMENT	DISTANCE (FT)	DIRECTION	DATE	TIME	COLLISION TYPE	INVOLVED	EXTENT	PRIMARY COLLISION FACTOR	LIGHTING	PARTY1	PARTY2	DIRECTION OF TRAVEL1	DIRECTION OF TRAVEL2	MOVEMENT1	MOVEMENT2	MUNI INVOLVED
Polk Street	Turk Street	Central	0	Not Stated	12/29/2008	12:07 PM	Broadside	Bicycle	Complaint of Pain	Improper Turning	Daylight	Driver	Bicyclist	South	South	Making Right Turn	Proceeding Straight	0
Polk Street	Turk Street	Central	185	North	2/18/2009	5:45 PM	Broadside	Bicycle	Other Visible Injury	Auto R/W Violation	Daylight	Bicyclist	Driver	South	West	Proceeding Straight	Making Left Turn	0
Polk Street	Vallejo Street	Central	103	South	6/25/2009	9:20 AM	Sideswipe	Bicycle	Other Visible Injury	Other Hazardous Movement	Daylight	Driver	Bicyclist	North	North	Other	Proceeding Straight	0
Polk Street	Washington Street	Central	0	Not Stated	2/6/2010	5:50 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Ped R/W Violation	Daylight	Driver	Pedestrian	East	East	Making Left Turn	Entering Traffic	0
Polk Street	Willow Street	Central	22	South	6/28/2009	2:15 PM	Broadside	Pedestrian	Complaint of Pain	Pedestrian Violation	Daylight	Pedestrian	Driver	South	South	Other	Proceeding Straight	0
Post Street	Polk Street	Central	0	Not Stated	10/13/2010	9:47 AM	Broadside	Bicycle	Complaint of Pain	Traffic Signals and Signs	Daylight	Bicyclist	Driver	South	East	Proceeding Straight	Proceeding Straight	0
Post Street	Polk Street	Central	0	Not Stated	5/1/2006	11:45 PM	Broadside	Bicycle	Severe Injury	Unsafe Speed	Dark - Street Lights	Driver	Bicyclist	East	South	Proceeding Straight	Proceeding Straight	0
Post Street	Polk Street	Central	0	Not Stated	1/14/2006	1:30 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	East	Not Stated	Making Left Turn	Proceeding Straight	0
Post Street	Polk Street	Central	5	East	1/16/2010	10:15 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	South	North	Making Left Turn	Not Stated	0
Post Street	Polk Street	Central	0	Not Stated	6/11/2010	7:08 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Pedestrian Violation	Daylight	Pedestrian	Driver	South	East	Proceeding Straight	Proceeding Straight	0
Post Street	Polk Street	Central	0	Not Stated	1/14/2006	1:30 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	East	Not Stated	Making Left Turn	Proceeding Straight	0
Post Street	Polk Street	Central	6	North	12/23/2007	2:27 AM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Traffic Signals and Signs	Dark - Street Lights	Driver	Pedestrian	East	North	Making Right Turn	Proceeding Straight	0
Sutter Street	Polk Street	Central	98	East	6/19/2007	2:02 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Other	Daylight	Driver	Pedestrian	West	Not Stated	Proceeding Straight	Not Stated	0
Sutter Street	Polk Street	Central	0	Not Stated	12/30/2007	11:47 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Ped R/W Violation	Dark - Street Lights	Driver	Pedestrian	West	West	Making Left Turn	Proceeding Straight	0
Sutter Street	Polk Street	Central	46	West	7/15/2008	11:07 PM	Vehicle - Pedestrian	Pedestrian	Complaint of Pain	Other Than Driver or Ped	Dark - Street Lights	Driver	Pedestrian	West	Not Stated	Slowing/Stopping	Not Stated	0
Turk Street	Polk Street	Central	0	Not Stated	9/12/2008	1:21 PM	Broadside	Bicycle	Complaint of Pain	Improper Turning	Daylight	Driver	Bicyclist	North	North	Making Right Turn	Proceeding Straight	0
Turk Street	Polk Street	Central	20	East	9/2/2009	8:35 PM	Sideswipe	Bicycle	Complaint of Pain	Improper Turning	Dark - Street Lights	Driver	Bicyclist	West	West	Proceeding Straight	Proceeding Straight	0
Turk Street	Polk Street	Central	23	West	6/11/2010	7:00 PM	Vehicle - Pedestrian	Pedestrian	Severe Injury	Pedestrian Violation	Daylight	Pedestrian	Pedestrian	North	North	Other	Other	0
Vallejo Street	Polk Street	Central	5	West	8/25/2009	5:37 PM	Vehicle - Pedestrian	Pedestrian	Other Visible Injury	Ped R/W Violation	Daylight	Driver	Pedestrian	West	South	Stopped in Road	Not Stated	0